

SEQUENCE LISTING

<110> ECOPIA BIOSCIENCES INC.

Farnet, Chris
McAlpine, James
Zazopoulos, Emmanuel
Bachmann, Brian
Pirae, Mahmood

<120> FARNESYL DIBENZODIAZEPINONE, PROCESSES FOR ITS PRODUCTION AND ITS USE AS
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<130> 3005-5US

<150> USSN 60/441,126

<151> 2003-01-21

<150> USSN 60/492,997

<151> 2003-08-07

<150> USSN 60/518,286

<151> 2003-11-10

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<212> DNA

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 <212> PRT
 <213> Micromonospora sp. strain 046-EC011

<400> 2

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Val	Val	Arg	Gly	Gly	Arg	Val	Val	Leu	Ser	Asp	Val	Ser	Val	Thr	Val
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Val	Val	Glu	Arg	Leu	Gly	Thr	Ile	Gly	Val	Ala	Arg	Gln	Asn	Leu	Glu
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Thr	Glu	Gly	Arg	Ala	Gly	Ala	Asp	Asp	Ala	Tyr	Ala	Ala	Ala	Leu	Asp
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Asp	Ala	Asp	Ser	Leu	Ala	Phe	Leu	Thr	Ala	Arg	Leu	Arg	Asp	His	Pro
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Ala	Thr	Glu	Phe	Leu	Asp	Leu	Asp	Pro	Ser	Ala	Asp	Gly	Arg	Pro	Arg
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Pro	Gly	Leu	Val	Gln	Ala	Leu	Arg	Arg	Arg	Gln	Glu	Ala	Leu	Asp	Ala
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Leu	Ser	Val	Leu	Ala	Gly	Asp	Leu	Thr	Pro	Ser	Thr	Gly	Glu	Val	Arg
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His	Leu	Ser	Gly	Ala	Arg	Val	Ala	Tyr	Leu	Gly	Gln	Glu	Val	Pro	Asp
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Trp	Pro	Pro	Ala	Leu	Leu	Ala	His	Asp	Leu	Tyr	Glu	Gln	His	Val	Gly
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Ser	Ala	Thr	Asn	Leu	Leu	Asp	Ala	Glu	Ala	Arg	Arg	Thr	Pro	Val	Gly
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Arg	Met	Ser	His	Gly	Gln	Gln	Arg	Arg	Leu	Asn	Leu	Ala	Leu	Arg	Leu
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Ala	Glu	Arg	Pro	Asp	Leu	Leu	Ile	Leu	Asp	Glu	Pro	Thr	Asn	His	Leu
				500					505					510	
Ser	Ala	Pro	Leu	Val	Asp	Asp	Leu	Thr	Ala	Ala	Leu	Leu	Thr	Thr	Arg
				515				520					525		
Ala	Ala	Val	Val	Val	Ala	Thr	His	Asp	Arg	Gln	Met	Leu	Gln	Asp	Leu
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Ala	Ala	Trp	Pro	Thr	Leu	Pro	Leu	Thr	Ala	Pro	Ala	Ala	Ser	Gly	Arg
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 <212> DNA
 <213> Micromonospora sp. strain 046-EC011

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 <212> PRT
 <213> Micromonospora sp. strain 046-EC011

<400> 4

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 Arg Glu Leu Ile Asp Phe Ala Gly Gly Ala Gly Gly Asn Pro His Leu
 50 55 60
 Val Ala Glu Leu Ala Arg Gly Leu Ala Glu Glu Gly Leu Ile Arg Glu
 65 70 75 80
 Thr Asn Gly Arg Ala Glu Leu Val Ser Arg Arg Ile Pro Arg Arg Val
 85 90 95
 Leu Ser Phe Val Met Arg Arg Leu Asn Asp Val Ser Ala Gly Cys Gln
 100 105 110
 Gln Phe Leu Lys Val Ala Ala Ala Leu Gly Arg Ser Phe Met Leu Glu
 115 120 125
 Asp Val Ser Arg Met Leu Gly Arg Ser Ser Ala Ala Leu Leu Pro Pro
 130 135 140
 Val Asp Glu Ala Ile Ala Ser Gly Phe Val Val Ala Ala Glu His Gln
 145 150 155 160
 Leu Ala Phe Gln Ser Asp Phe Leu Leu Arg Gly Ile Ile Glu Ser Ile
 165 170 175
 Pro Gly Pro Ala Arg Asp Ala Leu Arg Arg Glu Ala Met Ser Leu Ser
 180 185 190
 Gly Arg Arg Arg Pro Ala Ala Asp Gln Asn Arg Arg Leu Asp Ala Ala
 195 200 205
 Pro Thr Ala Pro Val Ser Ala Thr Gly Glu Asp Ala Thr Gly Ser Cys

210	215	220
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Ala Glu Ser Gly Asp Ala Ala Leu Ala Met Ala Leu Thr Ala Arg Ser 290 295 300		
Thr Gly Leu Trp Ser Ala Gly Lys Leu Ala Glu Gly Leu Lys Leu Gly 305 310 315 320		
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Asp Glu Ala Glu Ala Leu Ile Asn Glu Ala Glu Ala Gly Leu Arg Gly 355 360 365		
Leu Pro Ala Pro Ile Trp Thr Ala Ala Thr Ala Val Met Arg Ser Arg 370 375 380		
Leu Leu Leu Gln Ala Gly Arg Ile Gly Glu Ala Arg Arg Glu Ala Ala 385 390 395 400		
Leu Ala Thr Thr Ala Val Glu Gly Asp Ala Val Pro Met Leu Arg Pro 405 410 415		
Leu Ala Tyr Ala Val Leu Ser Thr Ala Ser Phe Tyr Met Gly Asp Leu 420 425 430		
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His Val Val Leu Asp Ser Val Gln Tyr Ser Trp Ala Glu Val Leu Ile 450 455 460		
Thr Val Lys Gln Glu Gly Pro Arg Ala Ala Ala Gln Leu Leu Ala Gly 465 470 475 480		
Lys His His Arg Leu Pro Thr Gln Arg Arg Leu Tyr Val Glu Val Pro 485 490 495		
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Leu Ala Asn Ser Ala Pro Ala Ala Leu Ala Leu Ile Ile Val Gln Ser		
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Arg Asp Pro Ile Ser Val Ala Leu Ala Thr Glu Glu Leu Ala Lys Leu		
565	570	575
Tyr Ala Ala Gln Ala Gln Ala Gly Gly Arg Pro Ala Thr Pro Ala Arg		
580	585	590
Ala Glu Glu Ala Ala Thr Pro Pro Ala Ser Cys Trp Ser Thr Leu Ser		
595	600	605
Asp Met Glu Gln Arg Ile Ala Tyr Leu Val Ser Val Gly Leu Thr Asn		
610	615	620
Arg Gln Ile Ala Lys Gln Val His Leu Ser Ala His Thr Val Asn Tyr		
625	630	635
His Leu Arg Lys Ile Tyr Arg Lys Leu Gly Phe Asn Thr Arg Ala Glu		
645	650	655
Leu Ala His Ala Ala Ala Thr Tyr Ser Gly Arg Ala Ala Ile Tyr Ser		
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Met Ser Gly Asp Gln Asp Trp Gly Ala Gly Ser Met Thr Gly Lys Ala		
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Ser

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 <211> 2070
 <212> DNA
 <213> Micromonospora sp. strain 046-EC011

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<210> 6

<211> 895

<212> PRT

<213> Micromonospora sp. strain 046-EC011

<400> 6

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Thr	Gly	Leu	Glu	Ala	Ala	Ala	Arg	Gly	Leu	Thr	Val	Val	Ala	Gly	Arg	
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Ala	Ser	Val	Thr	Asp	Gln	Pro	Val	Pro	Val	His	Leu	Leu	Val	Asn	Phe	
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Leu	Arg	His	Ala	Met	Pro	Gly	Glu	Ala	Ala	Val	Glu	Gln	Leu	Ala	Leu	
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Pro	Gly	Ala	Asn	Pro	Phe	Trp	Leu	Ile	Asp	Arg	Val	Gly	Asp	Leu	Val	
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Glu	Val	Ala	Ala	Arg	Arg	Arg	Pro	Leu	Val	Val	Ala	Leu	Asp	Asp	Ala	
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Gln	Arg	Ile	Asp	Asp	Val	Ser	Ala	Leu	Ala	Leu	Arg	Gly	Leu	Val	Pro	
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Arg	Leu	Ala	Ser	Ser	Pro	Val	Leu	Trp	Leu	Leu	Ala	Arg	Arg	Pro	Val	
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Arg	Gly	Leu	Leu	Glu	Glu	Leu	Pro	Pro	Pro	Leu	Arg	Arg	Leu	Leu	Ala	
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Arg	His	Asp	Val	Cys	Glu	Leu	Asp	Arg	Ala	Lys	Leu	Asp	Arg	Ala	Leu
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Pro	Arg	His	Gln	Ser	Pro	Gly	Cys	Ala	Pro	Gly	Arg	Arg	Pro	Leu	Trp
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Thr	Trp	Leu	Val	Arg	Ala	Leu	Gly	Ala	Ala	Asp	Gln	Leu	Asp	Glu	Ala
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Gln	Ala	Val	Leu	Asp	Thr	Val	Arg	Pro	Leu	Ala	Gln	Glu	Pro	Ser	His
545					550					555					560
Thr	Gly	Ser	Glu	Ser	Leu	Trp	Arg	Gly	His	Arg	Ala	Glu	Leu	Leu	Ala
				565					570					575	
Ala	Ala	Gly	Arg	Leu	Asp	Glu	Ala	Arg	Ala	Glu	Ala	Glu	Ala	Ala	Leu

580					585					590					
Arg	Ala	Ala	Asp	His	Ser	Arg	Pro	Gly	Asp	Cys	Val	Pro	Ala	Arg	Leu
		595					600					605			
Val	Leu	Ala	His	Leu	Gly	Val	His	His	Gly	Asp	Leu	Ala	Thr	Ala	Ser
	610					615					620				
Asp	Gln	Leu	Arg	Ala	Ala	Glu	Arg	Leu	Ala	Ser	Ala	Asp	Asp	Ser	Ala
625						630					635				640
Arg	Met	Asp	Trp	Ala	Leu	Ala	Arg	Phe	His	Ala	Ala	Ser	Gly	Arg	Pro
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Ala	Met	Met	Val	Gln	Thr	Leu	Ile	Asn	Val	Ala	Gly	Gln	Val	Ala	Pro
			660					665					670		
Asp	Pro	Leu	Leu	Phe	Thr	Glu	Ala	Pro	Ala	Ala	Ala	Ala	Thr	Leu	Val
		675					680						685		
Arg	Gln	Ala	Arg	Arg	Ala	Gly	Leu	Asp	Ala	Glu	Ala	Glu	Arg	Ala	Val
	690					695					700				
Glu	Val	Ala	Arg	Arg	Val	Ala	Arg	Gly	Asn	Pro	Phe	Val	Gln	Ser	Leu
705						710					715				720
Ala	Ala	Ala	Ala	Glu	His	Ala	Ala	Gly	Leu	Leu	Arg	Asp	Asp	Pro	Ala
				725					730					735	
Ala	Leu	Leu	Arg	Ala	Ala	Asp	Leu	His	Arg	Leu	Ala	Gly	Arg	Thr	Leu
			740					745					750		
Ala	Ala	Ala	Gly	Ala	Val	Glu	Asp	Ala	Ala	Arg	Ser	Thr	Arg	Asp	Arg
		755					760						765		
Ala	Glu	Ala	Thr	Arg	Leu	Leu	Glu	Ala	Ala	Thr	Asp	Gly	Tyr	Arg	Glu
	770					775					780				
Cys	Gly	Ala	Arg	Arg	Asp	Leu	Glu	Arg	Val	Glu	Ala	Glu	Leu	Arg	Gly
785						790					795				800
Leu	Pro	Ala	His	Asn	Val	Arg	Pro	Leu	Val	Pro	Asp	Arg	Pro	Arg	Ser
				805					810					815	
Gly	Trp	Glu	Ser	Leu	Thr	Ser	Ala	Glu	Leu	Arg	Val	Val	Arg	Ala	Ile
			820					825					830		
Val	Asp	Gly	Met	Thr	Asn	Arg	Glu	Ala	Ala	Ser	Ser	Leu	Phe	Leu	Ser
		835					840					845			
Pro	His	Thr	Val	Asp	Ser	His	Leu	Arg	Arg	Val	Phe	Ser	Lys	Leu	Asp
	850					855					860				
Ile	Asn	Ser	Arg	Val	Glu	Leu	Thr	Arg	Cys	Phe	Ile	Ala	His	Glu	Ala
865						870					875				880
Val	Arg	Pro	Ala	Leu	Ala	Thr	Thr	Arg	Gln	Pro	Ala	Ser	Ala	Gly	

885

890

895

<210> 7

<211> 2688

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 7

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ggcaagaccc acctgctgaa	ggtcaccgg	ctggaggcg	cgggccg	gctgacagt	180
gtggccggg	gggcaagcgt	cacggatcag	ccggtgccc	tacacctgct	240
ctgcgccacg cgatgccc	cgaaagcg	gtcgagcag	tcgccctg	gggcgccaac	300
ccgttctggc tgatcgacc	ggtcggcgat	ctggtcgagg	tcgcggcg	ccggcgccc	360
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gcccggccgg acgcctccgt	cctgcgctg	gcggcccgt	gcggcgga	cccgaaggtg	660
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tttcccgtcg accgggtgac	gggcctgct	gacggctcg	ccgccgacgt	gtccgccg	900
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cgggccggga cgccccactc	ccccgccgg	gtacgcgtca	cgcgctccg	gccggacg	1140
gccacgccc cgcgacggc	ggggccg	tcgggcccgt	gcgggtgcga	cgacgtggc	1200
gcagccgccc tgtcccacct	ggagaacgga	tccgccgagg	cgccacgagc	actggcccgt	1260
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<210> 8
<211> 362
<212> PRT
<213> Micromonospora sp. strain 046-EC011

<400> 8

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Ala	Ala	Leu	Arg	Asp	Phe	Phe	Ala	Glu	Arg	Arg	Ala	Glu	Ala	Arg	Glu
			20					25					30		
Leu	Gly	Asp	Asp	Phe	Ala	Ala	Leu	Val	Ala	Glu	Leu	Glu	Ser	Tyr	Val
		35					40					45			

Leu Arg Gly Gly Lys Arg Ile Arg Pro Ala Phe Ala Trp Leu Gly Trp
 50 55 60
 Ile Gly Ala Gly Gly Asp Pro Glu Asp Pro Val Ala Thr Ala Val Leu
 65 70 75 80
 Asn Ala Cys Ala Gly Phe Glu Leu Leu His Ala Ser Gly Leu Ile His
 85 90 95
 Asp Asp Ile Ile Asp Ala Ser Gln Thr Arg Arg Gly His Pro Ala Ala
 100 105 110
 His Val Ala Tyr Ala Glu Arg His Arg Ala Arg Arg Phe Ser Gly Asp
 115 120 125
 Pro Gly Thr Phe Gly Thr Gly Thr Ala Ile Leu Ile Gly Asp Leu Val
 130 135 140
 Leu Ile Trp Ala Asp Val Leu Val Arg Ala Ser Gly Leu Pro Ala Asp
 145 150 155 160
 Ala His Val Arg Val Ser Pro Val Trp Ser Ala Val Arg Ser Glu Val
 165 170 175
 Met Tyr Gly Gln Leu Leu Asp Leu Ile Ser Gln Val Ser Arg Ser Glu
 180 185 190
 Asp Val Asp Ala Ala Leu Arg Ile Asn Gln Tyr Lys Thr Ala Ser Tyr
 195 200 205
 Thr Val Glu Arg Pro Leu Gln Phe Gly Ala Ala Ile Ala Gly Ala Asp
 210 215 220
 Asp Asp Leu Phe Ala Ala Tyr Arg Ala Phe Gly Ala Asp Val Gly Ile
 225 230 235 240
 Ala Phe Gln Leu Arg Asp Asp Leu Leu Gly Val Phe Gly Asp Pro Val
 245 250 255
 Val Thr Gly Lys Pro Ser Gly Asp Asp Leu Arg Glu Gly Lys Arg Thr
 260 265 270
 Val Leu Leu Ala Thr Ala Leu Lys Arg Ala Asp Glu Arg Asp Pro Asp
 275 280 285
 Ala Ala Ala Tyr Leu Arg Ala Lys Val Gly Thr Asp Leu Ala Asp Glu
 290 295 300
 Glu Ile Ala Arg Ile Arg Ala Ile Phe Arg Asp Val Gly Ala Val Glu
 305 310 315 320
 Glu Ile Glu Arg Gln Ile Ser Gln Arg Thr Asp Arg Ala Leu Ala Ala
 325 330 335
 Leu Glu Ala Ser Ser Ala Thr Ala Pro Ala Lys His Gln Leu Ala Asp
 340 345 350

Met Ala Ile Lys Ala Thr Gln Arg Ala Gln
 355 360

<210> 9
 <211> 1089
 <212> DNA
 <213> Micromonospora sp. strain 046-EC011

<400> 9
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 gtcgccgagc tggagagcta cgtcctgcgg ggccggcaagc gcatccggcc cgccttcgcc 180
 tggctgggct ggatcggcgc cggcggcgac ccggaggacc cggtaggcgc cgcggtgctg 240
 aacgcctgcg ccgggttcga gctgctgcac gcgtccggcc tcatccacga cgacatcatc 300
 gacgcgtcgc agaccgcgcg cgcccatccc gccgcgcacg tcgcgtacgc cgaacggcat 360
 cgggcgcggc gcttctccgg tgaccgcgga acgttcggca ccggcaccgc catcctgatc 420
 ggagacctcg tcctgatctg ggccgacgtc ctggtccgcg cctccggcct gccggccgac 480
 gcgcacgtgc gggctctgcc ggtgtggtcg gcggtgcgct ccgaggtcat gtacggccag 540
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 aaccagtaca agaccgcgtc gtacacgggtg gagcggccac tgcagttcgg cgcggcgatc 660
 gccggcgcgg acgacgacct cttcgcggcc taccgcgcct tcggcgccga cgtgggtatt 720
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 gccagtgga 1089

<210> 10
 <211> 354
 <212> PRT
 <213> Micromonospora sp. strain 046-EC011

<400> 10

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	20	25	30
Ala Ile Leu	Leu Gly Glu His Ala Val	Val Tyr Gly Ala Pro	Ala Leu
	35	40	45
Ala Val Pro	Val Pro Gln Leu Thr	Ala Val Ala Lys Ala Arg	Arg Ala
	50	55	60
Gly Gly Asp	Gly Gly Asp Glu Val Ser Phe	Ala Ile Ala Gly Leu Glu	
65	70	75	80
Ser Pro Glu	Val Thr Ser Leu Pro Thr	Asp Gly Leu Gln His	Leu Val
	85	90	95
Thr Glu Phe	Arg Gln Arg Ala Ala Val	Thr Glu Pro Met Arg	Val Asp
	100	105	110
Val Leu Val	Asp Cys Ala Ile Pro Gln	Gly Arg Gly Leu Gly Ser	Ser
	115	120	125
Ala Ala Cys	Ala Arg Ala Ala Val Leu	Ala Leu Ala Asp Ala Phe	Asp
	130	135	140
Arg Arg Leu	Asp Ala Ala Thr Val Phe	Asp Leu Val Gln Thr Ser	Glu
145	150	155	160
Asn Val Ala	His Gly Arg Ala Ser Gly	Ile Asp Ala Leu Ala Thr	Gly
	165	170	175
Ala Thr Ala	Pro Leu Ile Phe Arg Asn	Gly Val Gly Arg Glu Leu	Pro
	180	185	190
Val Ala Met	Ala Gly Ala Ala Arg Ala	Ala Arg Gly Ser Gly Pro	Ala
	195	200	205
Gly Phe Asp	Ala Val Leu Val Ile Ala	Asp Ser Gly Val Ser Gly	Ser
	210	215	220
Thr Arg Asp	Ala Val Glu Leu Leu Arg	Gly Ala Phe Glu Arg Ser	Pro
225	230	235	240
Arg Thr Arg	Asp Glu Phe Val Ser Arg	Val Thr Ser Leu Thr Glu	Ala
	245	250	255
Ala Ala His	Asp Leu Leu Gln Gly Arg	Val Ala Asp Phe Gly Ala	Arg
	260	265	270
Leu Thr Glu	Asn His Arg Leu Leu Arg	Glu Val Gly Ile Ser Thr	Glu
	275	280	285
Arg Ile Asp	Arg Met Val Asp Ala Ala	Leu Ala Ala Gly Ser Pro	Gly
	290	295	300
Ala Lys Ile	Ser Gly Gly Gly Leu Gly	Gly Cys Met Ile Ala Leu	Ala

305		310		315		320									
Arg	Asp	Arg	Gln	Glu	Ser	Ala	Ala	Val	Val	Arg	Ser	Val	Gln	Gln	Ala
			325						330					335	
Gly	Ala	Val	Arg	Thr	Trp	Thr	Val	Pro	Met	Gly	Arg	Phe	Thr	Gly	His
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Asp Asp

<210> 11
 <211> 1065
 <212> DNA
 <213> Micromonospora sp. strain 046-EC011

<400> 11

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gtcgtgtacg gcgctccggc gctcgccgtc ccggtgccgc aactgaccgc cgtggccaag	180
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agcccggagg tgacgtcgct tccgaccgac ggccctgcaac atctggtgac ggagttccgg	300
cagcggggccg ccgtcaccga gccgatgcgc gtcgacgtgc tcgtggactg cgccatcccg	360
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gacgcgttcg accgccgcct cgacgccgcc acggtgttcg atctggtgca gacctcggag	480
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cgggaccgcc aggaatccgc ggcggtgggtg ccgagcgtcc agcaggccgg cgccgtccgc	1020
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<210> 12
 <211> 346
 <212> PRT

<213> Micromonospora sp. strain 046-EC011

<400> 12

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Pro Ala Thr Ala Val Ala His Pro Asn Ile Ala Leu Ile Lys Tyr Trp
          20          25          30

Gly Lys Arg Asp Glu Gln Leu Met Ile Pro Tyr Ala Asp Ser Leu Ser
          35          40          45

Met Thr Leu Asp Val Phe Pro Thr Thr Thr Thr Val Arg Ile Asp Ser
          50          55          60

Gly Ala Ala Ala Asp Glu Val Val Leu Asp Gly Ser Pro Ala Asp Gly
65          70          75          80

Glu Arg Arg Gln Arg Val Val Thr Phe Leu Asp Leu Val Arg Lys Leu
          85          90          95

Ala Gly Arg Thr Glu Arg Ala Cys Val Asp Thr Arg Asn Ser Val Pro
          100          105          110

Thr Gly Ala Gly Leu Ala Ser Ser Ala Ser Gly Phe Ala Ala Leu Ala
          115          120          125

Leu Ala Gly Ala Ala Ala Tyr Gly Leu Asp Leu Asp Thr Thr Ala Leu
          130          135          140

Ser Arg Leu Ala Arg Arg Gly Ser Val Ser Ala Ser Arg Ser Val Phe
145          150          155          160

Gly Gly Phe Ala Met Cys His Ala Gly Pro Gly Ala Gly Thr Ala Ala
          165          170          175

Asp Leu Gly Ser Tyr Ala Glu Pro Val Pro Val Ala Pro Leu Asp Val
          180          185          190

Ala Leu Val Ile Ala Ile Val Asp Ala Gly Pro Lys Ala Val Ser Ser
          195          200          205

Arg Glu Gly Met Arg Arg Thr Val Arg Thr Ser Pro Leu Tyr Gln Ser
          210          215          220

Trp Val Ala Ser Gly Arg Ala Asp Leu Ala Glu Met Arg Ala Ala Leu
225          230          235          240

Leu Gln Gly Asp Leu Asp Ala Val Gly Glu Ile Ala Glu Arg Asn Ala
          245          250          255

Leu Gly Met His Ala Thr Met Leu Ala Ala Arg Pro Ala Val Arg Tyr
          260          265          270

Leu Ala Pro Val Thr Val Ala Val Leu Asp Ser Val Leu Arg Leu Arg
          275          280          285
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Ala Asp Gly Val Ser Ala Tyr Ala Thr Met Asp Ala Gly Pro Asn Val
 290 295 300

Lys Val Leu Cys Arg Arg Ala Asp Ala Asp Arg Val Ala Asp Thr Leu
 305 310 315 320

Arg Asp Ala Ala Pro Ser Cys Ala Val Val Val Ala Gly Pro Gly Pro
 325 330 335

Ala Ala Arg Pro Asp Pro Gly Ser Arg Pro
 340 345

<210> 13
 <211> 1041
 <212> DNA
 <213> Micromonospora sp. strain 046-EC011

<400> 13
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 cggatcgaca gcggcgcggc ggccgacgag gtcgtcctcg acggctcgcc cgccgacggc 240
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 gaacgggcct gcgtcgacac ccgcaactcc gtgcccaccg gcgccggcct ggcgctcctg 360
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 gccaccatgc tggccgcccc gccggcggtg cgctacctgg cgccggtcac tgcgcccgtg 840
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 gaccggggca gccggccgtg a 1041

<210> 14

<211> 369
 <212> PRT
 <213> Micromonospora sp. strain 046-ECO11

<400> 14

Val	Thr	Gly	Pro	Gly	Ala	Val	Arg	Arg	His	Ala	Pro	Gly	Lys	Leu	Phe
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Val	Ala	Gly	Glu	Tyr	Ala	Val	Leu	Glu	Pro	Gly	His	Pro	Ala	Leu	Leu
			20					25					30		
Val	Ala	Val	Asp	Arg	Gly	Val	Asp	Val	Thr	Val	Ser	Gly	Ala	Asp	Ala
		35					40					45			
His	Leu	Val	Val	Asp	Ser	Asp	Leu	Cys	Pro	Glu	Gln	Ala	Cys	Leu	Arg
	50					55					60				
Trp	Gln	Asp	Gly	Arg	Leu	Val	Gly	Ala	Gly	Asp	Gly	Gln	Pro	Ala	Pro
65					70					75					80
Asp	Ala	Leu	Gly	Ala	Val	Val	Ser	Ala	Ile	Glu	Val	Val	Gly	Glu	Leu
				85					90					95	
Leu	Thr	Gly	Arg	Gly	Leu	Arg	Pro	Leu	Pro	Met	Arg	Val	Ala	Ile	Thr
			100					105					110		
Ser	Arg	Leu	His	Arg	Asp	Gly	Thr	Lys	Phe	Gly	Leu	Gly	Ser	Ser	Gly
		115					120					125			
Ala	Val	Thr	Val	Ala	Thr	Val	Thr	Ala	Val	Ala	Ala	Tyr	His	Gly	Val
		130					135				140				
Glu	Leu	Ser	Leu	Glu	Ser	Arg	Phe	Arg	Leu	Ala	Met	Leu	Ala	Thr	Val
145					150					155					160
Arg	Asp	Gly	Ala	Asp	Ala	Ser	Gly	Gly	Asp	Leu	Ala	Ala	Ser	Val	Trp
				165					170					175	
Gly	Gly	Trp	Ile	Ala	Tyr	Gln	Ala	Pro	Asp	Arg	Ala	Ala	Val	Arg	Glu
			180					185					190		
Met	Ala	Arg	Arg	Arg	Gly	Val	Glu	Glu	Thr	Met	Arg	Ala	Pro	Trp	Pro
		195					200					205			
Gly	Leu	Arg	Val	Arg	Arg	Leu	Pro	Pro	Pro	Arg	Gly	Leu	Ala	Leu	Glu
	210					215					220				
Val	Gly	Trp	Thr	Gly	Glu	Pro	Ala	Ser	Ser	Ser	Ser	Leu	Thr	Gly	Arg
225					230					235					240
Leu	Ala	Ala	Ser	Arg	Trp	Arg	Gly	Ser	Pro	Ala	Arg	Trp	Ser	Phe	Thr
				245					250					255	
Ser	Arg	Ser	Gln	Glu	Cys	Val	Arg	Thr	Ala	Ile	Asp	Ala	Leu	Glu	Arg
			260					265					270		

Gly Asp Asp Gln Glu Leu Leu His Gln Val Arg Arg Ala Arg His Val
 275 280 285
 Leu Ala Glu Leu Asp Asp Glu Val Arg Leu Gly Ile Phe Thr Pro Arg
 290 295 300
 Leu Thr Ala Leu Cys Asp Ala Ala Glu Thr Val Gly Gly Ala Ala Lys
 305 310 315 320
 Pro Ser Gly Ala Gly Gly Gly Asp Cys Gly Ile Ala Leu Leu Asp Ala
 325 330 335
 Thr Ala Ala Thr Arg Thr Ala Arg Leu Arg Glu Gln Trp Ala Ala Ala
 340 345 350
 Gly Val Leu Pro Met Pro Ile Gln Val His Gln Thr Asn Gly Ser Ala
 355 360 365

Arg

<210> 15
 <211> 1110
 <212> DNA
 <213> Micromonospora sp. strain 046-EC011

<400> 15
 gtgaccggcc cgggcgccgt gcgccgccac gcgccgggca agctgttcgt cgccggtgag 60
 tacgcggtgc tggagccggg ccacccggcg ctgctggttg cggtcgacag gggagtggac 120
 gtcaccgtct ccggcgccga cgcccacctc gttgtcgact ccgacctctg cccggagcag 180
 gcgtgcctgc ggtggcagga cggccggctc gtcggcgcg gcgacgggca gccggcgccc 240
 gacgccctcg gcgccgtggt ctcggcgatc gaggtggtcg gcgaactcct gaccggacga 300
 gggctgcgcc cgctgcccac gcgggtggcg atcaccagcc ggctgcaccg cgacggcacg 360
 aagttcggcc tcgggtcgag cggggcggtg acagtgcga cggtgaccgc agtggccgcg 420
 taccacgggg tggagctgtc gtcgaatcg cggttccggc tggcgatgct ggcgacggtg 480
 cgtgacggcg ccgacgcctc cggcggtgat ctggccgcga gcgtctgggg cggctggatc 540
 gcctaccagg cccccgaccg cgcggccgtg cgcgagatgg cgcggcggcg cggcgctcgag 600
 gagacgatgc gcgcgccctg gccgggcctg cgggtccggc ggctgccacc accgcgtggc 660
 ctcgcgctgg aggtgggctg gaccggcgag ccggcgagca gcagctcgtt gaccgggchg 720
 ctggccgcct cccggtggcg gggcagcccg gcgcggtgga gcttcaccag ccgtagccag 780
 gagtgtgtgc gtaccgccat cgacgcgtg gagcggggcg acgaccagga actgctgcac 840
 caggtccggc gggcccggca cgtgcttgcc gagctggacg acgaggtccg gctcgggatc 900

ttcaccccc ggctgacggc gctgtgcgac gccgccgaga ccgtcggcgg cgccggccaaa 960
ccgtccggcg ccggtggcgg ggactgcggc atcgcggtgc tggacgccac cgccgcgacg 1020
cggaccgcgc ggctgcgcga gcagtgggcc gccgccgggg tgctcccat gccgatccag 1080
gtccatcaga cgaacgggag cgcgcgatga 1110

<210> 16
<211> 360
<212> PRT
<213> Micromonospora sp. strain 046-EC011

<400> 16

Met	Ile	Ala	Asn	Arg	Lys	Asp	Asp	His	Val	Arg	Leu	Ala	Ala	Glu	Gln	1	5	10	15
Gln	Gly	Arg	Leu	Gly	Gly	His	His	Glu	Phe	Asp	Asp	Val	Ser	Phe	Val	20	25	30	
His	His	Ala	Leu	Ala	Gly	Ile	Asp	Arg	Ser	Asp	Val	Ser	Leu	Ala	Thr	35	40	45	
Ser	Phe	Gly	Gly	Ile	Asp	Trp	Pro	Val	Pro	Leu	Cys	Ile	Asn	Ala	Met	50	55	60	
Thr	Gly	Gly	Ser	Thr	Lys	Thr	Gly	Leu	Ile	Asn	Arg	Asp	Leu	Ala	Ile	65	70	75	80
Ala	Ala	Arg	Glu	Thr	Gly	Val	Pro	Ile	Ala	Thr	Gly	Ser	Met	Ser	Ala	85	90	95	
Tyr	Phe	Ala	Asp	Glu	Ser	Val	Ala	Glu	Ser	Phe	Ser	Val	Met	Arg	Arg	100	105	110	
Glu	Asn	Pro	Asp	Gly	Phe	Ile	Met	Ala	Asn	Val	Asn	Ala	Thr	Ala	Ser	115	120	125	
Val	Glu	Arg	Ala	Arg	Arg	Ala	Val	Asp	Leu	Met	Arg	Ala	Asp	Ala	Leu	130	135	140	
Gln	Ile	His	Leu	Asn	Thr	Ile	Gln	Glu	Thr	Val	Met	Pro	Glu	Gly	Asp	145	150	155	160
Arg	Ser	Phe	Ala	Ala	Trp	Gly	Pro	Arg	Ile	Glu	Gln	Ile	Val	Ala	Gly	165	170	175	
Val	Gly	Val	Pro	Val	Ile	Val	Lys	Glu	Val	Gly	Phe	Gly	Leu	Ser	Arg	180	185	190	
Glu	Thr	Leu	Leu	Arg	Leu	Arg	Asp	Met	Gly	Val	Arg	Val	Ala	Asp	Val	195	200	205	
Ala	Gly	Arg	Gly	Gly	Thr	Asn	Phe	Ala	Arg	Ile	Glu	Asn	Asp	Arg	Arg	210	215	220	

Asp Ala Ala Asp Tyr Ser Phe Leu Asp Gly Trp Gly Gln Ser Thr Pro
 225 230 235 240
 Ala Cys Leu Leu Asp Ala Gln Gly Val Asp Leu Pro Val Leu Ala Ser
 245 250 255
 Gly Gly Ile Arg Asn Pro Leu Asp Val Val Arg Gly Leu Ala Leu Gly
 260 265 270
 Ala Gly Ala Ala Gly Val Ser Gly Leu Phe Leu Arg Thr Leu Leu Asp
 275 280 285
 Gly Gly Val Pro Ala Leu Leu Ser Leu Leu Ser Thr Trp Leu Asp Gln
 290 295 300
 Ile Glu Ala Leu Met Thr Ala Leu Gly Ala Arg Thr Pro Ala Asp Leu
 305 310 315 320
 Thr Arg Cys Asp Leu Leu Ile Gln Gly Arg Leu Ser Ala Phe Cys Ala
 325 330 335
 Ala Arg Gly Ile Asp Thr His Arg Leu Ala Thr Arg Ser Gly Ala Thr
 340 345 350
 His Glu Met Ile Gly Gly Ile Arg
 355 360

<210> 17
 <211> 1083
 <212> DNA
 <213> Micromonospora sp. strain 046-EC011

<400> 17
 atgatcgcca accgcaagga cgaccacgtc cggtcgcgcg ccgagcagca gggccggctc 60
 ggcggtcacc acgagttcga cgacgtgtcc ttcgtgcacc acgccctggc cggcatcgac 120
 cgggtccgacg tctcgttggc cacgtcgttc ggcggcatcg actggccggt gccgtgtgc 180
 atcaacgcga tgaccggcgg cagcaccaag accggcctga tcaaccggga cctggcgatc 240
 gcggcccggg agaccggcgt accgatcgcc accgggtcga tgagcgccta cttcgccgac 300
 gagtcggtgg ccgagagttt cagcgtgatg cgccgggaga accccgacgg gttcatcatg 360
 gccaacgtca acgccaccgc ctccgtcgaa cgggcccggc gggctgtcga cctgatgcgg 420
 gccgacgcgc tgcagatcca cctgaacacc atccaggaga cggatgatgcc ggagggggac 480
 cggtcgttcg ccgcctgggg gccgcggatc gaacagatcg tcgccggcgt cggtgtgccg 540
 gtgatcgta aggaggtcgg cttcgggctc agccgcgaaa cgctgctgcg gctgcgggac 600
 atgggcgtcc ggggtggcca cgtcgccggc cgcgggcgca cgaacttcgc gcgcatcgag 660
 aacgaccggc gggacgccgc cgactactcc ttcctcgacg ggtggggaca gtcgacacc 720

gcctgcctgc tggacgcca gggcgtggac ctgcccgtgc tggcctccgg cggcatccgc 780
 aaccgcctcg acgtgggtccg cgggctggcg ctcgcgcccg gcgcggcccg ggtgtccgga 840
 ctgttcctgc gcacgtcct ggacggcggc gtgccggcgc tgctgtcgct gctgtccacc 900
 tggctcgacc agatcgaagc cctgatgacc gccctgggcg cgcggacccc ggccgacctg 960
 acccgctgcg acctgctgat ccagggtcgg ctgagcgcgt tctgcgcggc ccggggcatc 1020
 gacaccacc gcctcgccac ccgttcggc gccaccacg agatgatcgg aggcattcga 1080
 tga 1083

<210> 18
 <211> 351
 <212> PRT
 <213> Micromonospora sp. strain 046-EC011

<400> 18

Met	Asn	Asp	Ala	Ile	Ala	Gly	Val	Pro	Met	Lys	Trp	Val	Gly	Pro	Val	1	5	10	15
Arg	Ile	Ser	Gly	Asn	Val	Ala	Gln	Ile	Glu	Thr	Glu	Val	Pro	Leu	Ala	20	25	30	
Thr	Tyr	Glu	Ser	Pro	Leu	Trp	Pro	Ser	Val	Gly	Arg	Gly	Ala	Lys	Ile	35	40	45	
Ser	Arg	Met	Val	Glu	Ala	Gly	Ile	Val	Ala	Thr	Leu	Val	Asp	Glu	Arg	50	55	60	
Met	Thr	Arg	Ser	Val	Phe	Val	Arg	Ala	Lys	Asp	Ala	Gln	Thr	Ala	Tyr	65	70	75	80
Leu	Ala	Ser	Leu	Glu	Val	Asp	Ala	Arg	Phe	Asp	Glu	Leu	Arg	Asp	Ile	85	90	95	
Val	Arg	Thr	Cys	Gly	Arg	Phe	Val	Glu	Leu	Ile	Gly	Phe	His	His	Glu	100	105	110	
Ile	Thr	Ala	Asn	Leu	Leu	Phe	Leu	Arg	Phe	Ser	Phe	Thr	Thr	Gly	Asp	115	120	125	
Ala	Ser	Gly	His	Asn	Met	Ala	Thr	Leu	Ala	Ala	Asp	Ala	Leu	Leu	Lys	130	135	140	
His	Ile	Leu	Asp	Thr	Ile	Pro	Gly	Ile	Ser	Tyr	Gly	Ser	Ile	Ser	Gly	145	150	155	160
Asn	Tyr	Cys	Thr	Asp	Lys	Lys	Ala	Thr	Ala	Ile	Asn	Gly	Ile	Leu	Gly	165	170	175	
Arg	Gly	Lys	Asn	Val	Val	Thr	Glu	Leu	Val	Val	Pro	Arg	Glu	Ile	Val				

180					185					190					
His	Asp	Ser	Leu	His	Thr	Thr	Ala	Ala	Ala	Ile	Ala	Gln	Leu	Asn	Val
	195						200					205			
His	Lys	Asn	Met	Ile	Gly	Thr	Leu	Leu	Ala	Gly	Gly	Ile	Arg	Ser	Ala
	210					215					220				
Asn	Ala	His	Tyr	Ala	Asn	Met	Leu	Leu	Gly	Phe	Tyr	Leu	Ala	Thr	Gly
	225					230					235				240
Gln	Asp	Ala	Ala	Asn	Ile	Val	Glu	Gly	Ser	Gln	Gly	Val	Thr	Val	Ala
				245					250					255	
Glu	Asp	Arg	Asp	Gly	Asp	Leu	Tyr	Phe	Ser	Cys	Thr	Leu	Pro	Asn	Leu
			260					265					270		
Ile	Val	Gly	Thr	Val	Gly	Asn	Gly	Lys	Gly	Leu	Gly	Phe	Val	Glu	Glu
		275					280					285			
Asn	Leu	Glu	Arg	Leu	Gly	Cys	Arg	Ala	Ser	Arg	Asp	Pro	Gly	Glu	Asn
	290					295					300				
Ala	Arg	Arg	Leu	Ala	Val	Ile	Ala	Ala	Ala	Thr	Val	Leu	Cys	Gly	Glu
	305					310					315				320
Leu	Ser	Leu	Leu	Ala	Ala	Gln	Thr	Asn	Pro	Gly	Glu	Leu	Met	Arg	Ala
				325					330					335	
His	Val	Arg	Leu	Glu	Arg	Pro	Thr	Glu	Thr	Thr	Lys	Ile	Gly	Ala	
			340					345					350		

<210> 19

<211> 1056

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 19

atgaacgacg	cgatcgccgg	tgtgcccattg	aaatgggtag	gtcccgtgcg	gatctcggga	60
aacgtggcgc	agatcgagac	ggaggttccg	ctcgccacgt	acgagtcgcc	gctctggccc	120
tccgtcggcc	ggggcgcgaa	gatctcccgg	atggtcgagg	cgggcatcgt	cgccacgctc	180
gtcgacgagc	gcatgaccgg	ctcggtgttc	gtgcgcgcca	aggacgcgca	gaccgcctac	240
ctggcctcgc	ttgaggtcga	cgcgcggttc	gacgaactgc	gtgacatcgt	gcgcacctgc	300
ggcaggttcg	tcgagctgat	cgggttccac	cacgagatca	ccgcgaacct	gctgttctctg	360
cggttcagtt	tcaccaccgg	cgacgcgtcc	gggcacaaca	tggcgacgct	ggccgcccgc	420
gcgctgctga	agcacatcct	ggacaccatt	ccgggcatct	cgtagcgctc	gatctcgggc	480
aactactgca	ccgacaagaa	ggccaccgcg	ataaacggca	ttctcggccg	gggcaagaac	540
gtggtcaccg	agctggtcgt	gccgcgggag	atcgtccacg	acagcctgca	cacgacggcg	600

gcggcgatcg cccagctgaa cgtgcacaag aacatgatcg gcacgttgct cgccggcggt 660
atccgctcgg ccaacgcccc ctacgcgaac atgctgctcg ggttctacct ggccacgggt 720
caggacgccg cgaacatcgt cgaggggtcc cagggcgtga cggtcgccga ggaccgcgac 780
ggcgacctct acttctcctg cacgctgccc aacctgatcg tgggcaccgt cggcaacggc 840
aaggggctcg gcttcgtcga ggagaacctg gagcggctcg gctgccgcgc ctcgcgtgat 900
ccgggcgaga acgccccggc gctcgcggtc atcgcggccg cgacggtgct ctgcggcgag 960
ctgtccctgc tcgccgcgca gaccaacccg ggcgagctga tgcgggcgca cgtccggctc 1020
gaacgcccga ccgagaccac gaagatcgga gcctga 1056

<210> 20

<211> 391

<212> PRT

<213> Micromonospora sp. strain 046-EC011

<400> 20

Met Ala Glu Arg Pro Ala Val Gly Ile His Asp Leu Ser Ala Ala Thr
1 5 10 15

Ala His His Val Leu Thr His Glu Thr Leu Ala Ala Ser Asn Gly Ala
20 25 30

Asp Val Ala Lys Tyr His Arg Gly Ile Gly Leu Arg Ala Met Ser Val
35 40 45

Pro Ala Pro Asp Glu Asp Ile Val Thr Met Ala Ala Ala Ala Ala
50 55 60

Pro Val Val Ala Arg His Gly Thr Asp Arg Ile Arg Thr Val Val Phe
65 70 75 80

Ala Thr Glu Ser Ser Val Asp Gln Ala Lys Ala Ala Gly Ile His Val
85 90 95

His Ser Leu Leu Gly Leu Pro Ser Ala Thr Arg Val Val Glu Leu Lys
100 105 110

Gln Ala Cys Tyr Gly Gly Thr Ala Gly Leu Gln Phe Ala Ile Gly Leu
115 120 125

Val His Arg Asp Pro Ser Gln Gln Val Leu Val Ile Ala Ser Asp Val
130 135 140

Ser Lys Tyr Ala Leu Gly Glu Pro Gly Glu Ala Thr Gln Gly Ala Ala
145 150 155 160

Ala Val Ala Met Leu Val Gly Ala Asp Pro Ala Leu Val Arg Val Glu
165 170 175

Asp Pro Ser Gly Met Phe Thr Ala Asp Val Met Asp Phe Trp Arg Pro
 180 185 190
 Asn Tyr Arg Thr Thr Ala Leu Val Asp Gly His Glu Ser Ile Ser Ala
 195 200 205
 Tyr Leu Gln Ala Leu Glu Gly Ser Trp Lys Asp Tyr Thr Glu Arg Gly
 210 215 220
 Gly Arg Thr Leu Asp Glu Phe Gly Ala Phe Cys Tyr His Gln Pro Phe
 225 230 235 240
 Pro Arg Met Ala Asp Lys Ala His Arg His Leu Leu Asn Tyr Cys Gly
 245 250 255
 Arg Asp Val Asp Asp Ala Leu Val Ala Gly Ala Ile Gly His Thr Thr
 260 265 270
 Ala Tyr Asn Ala Glu Ile Gly Asn Ser Tyr Thr Ala Ser Met Tyr Leu
 275 280 285
 Gly Leu Ala Ala Leu Leu Asp Thr Ala Asp Asp Leu Thr Gly Arg Thr
 290 295 300
 Val Gly Phe Leu Ser Tyr Gly Ser Gly Ser Val Ala Glu Phe Phe Ala
 305 310 315 320
 Gly Thr Val Val Pro Gly Tyr Arg Ala His Thr Arg Pro Asp Gln His
 325 330 335
 Arg Ala Ala Ile Asp Arg Arg Gln Glu Ile Asp Tyr Ala Thr Tyr Arg
 340 345 350
 Glu Leu His Glu His Ala Phe Pro Val Asp Gly Gly Asp Tyr Pro Ala
 355 360 365
 Pro Glu Val Thr Thr Gly Pro Tyr Arg Leu Ala Gly Leu Ser Gly His
 370 375 380
 Lys Arg Val Tyr Glu Pro Arg
 385 390

<210> 21

<211> 1176

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 21

atggccgaga gacccgccgt cggcatccac gacctgtccg ccgcgacggc gcatcacgtg	60
ctgacacacg agaccctggc cgcgagcaac ggcgccgacg tggccaagta ccaccgtggc	120
atcgggctgc gggcgatgag cgtgcccgcc ccggacgagg acatcgtgac gatggctgct	180
gccgccgccg cgccggtggt cgcccgccac ggcaccgacc ggatccggac cgtcgtgttc	240

gccacggagt cgtcggtcga ccaggcgaag gcggccggga tacacgtcca ctccctgctc 300
 ggctccccc cggccacccg ggtggtcgag ctgaagcagg cctgctacgg cggtagcgcg 360
 ggactgcagt tcgccatcgg cctggtgcac cgtgaccggt cgcagcaggt cctggtgatc 420
 gccagcgacg tgtcgaagta cgcgctgggt gagcccggcg aggcgacca gggcgccgcg 480
 gcggtcgcca tgctcgtcgg cgcggacccg gcgctggtac gcgtcgagga cccgtcgggc 540
 atgttcaccg ccgacgtcat ggacttctgg cggccgaact accgcaccac cgccctggtc 600
 gacgggcacg agtccatctc cgcctacctg caggcgctgg agggctcgtg gaaggactac 660
 accgagcgcg gcggtcgcac cctggacgag ttcggcgcggt tctgctacca ccagccgttc 720
 ccgaggatgg ccgacaaggc gcaccggcac ctgctcaact actgcgggcg cgacgtcgac 780
 gacgcgctgg tggccggggc catcgggcac accaccgctg acaacgccga gatcggcaac 840
 agctacacgg cgtcgatgta tctcgggctc gcggcactgc tcgacaccgc cgacgacctg 900
 accggccgga ccgtcggctt cctcagctac ggggtccggca gcgtcgccga gttcttcgcc 960
 ggcaactgtc tgcccgggta ccgcgcgcac acgcgacccg accagcaccg cgcgcgcatc 1020
 gaccggcggc aggagatcga ctacgcgacg taccgggagt tgcacgagca cgccttcccg 1080
 gtcgacggcg gcgactatcc ggcgccggag gtgaccaccg ggccgtaccg gctggccggg 1140
 ctctccggtc acaagcgcggt ctacgagccg cgatag 1176

<210> 22
 <211> 290
 <212> PRT
 <213> Micromonospora sp. strain 046-EC011

<400> 22

Val	Ala	Glu	Leu	Tyr	Ser	Thr	Ile	Glu	Glu	Ser	Ala	Arg	Gln	Leu	Asp
1				5					10					15	
Val	Pro	Cys	Ser	Arg	Asp	Arg	Val	Trp	Pro	Ile	Leu	Ser	Ala	Tyr	Gly
			20					25					30		
Asp	Ala	Phe	Ala	His	Pro	Glu	Ala	Val	Val	Ala	Phe	Arg	Val	Ala	Thr
		35					40					45			
Ala	Leu	Arg	His	Ala	Gly	Glu	Leu	Asp	Cys	Arg	Phe	Arg	Thr	His	Pro
	50					55					60				
Asp	Asp	Arg	Asp	Pro	Tyr	Ala	Ser	Ala	Leu	Ala	Arg	Gly	Leu	Thr	Pro
65					70					75				80	
Arg	Thr	Asp	His	Pro	Val	Gly	Ala	Leu	Leu	Ser	Glu	Val	His	Arg	Arg
				85					90					95	

Cys Pro Val Glu Ser His Gly Ile Asp Phe Gly Val Val Gly Gly Phe
 100 105 110
 Lys Lys Ile Tyr Ala Ala Phe Ala Pro Asp Glu Leu Gln Val Ala Thr
 115 120 125
 Ser Leu Ala Gly Ile Pro Ala Met Pro Arg Ser Leu Ala Ala Asn Ala
 130 135 140
 Asp Phe Phe Thr Arg His Gly Leu Asp Asp Arg Val Gly Val Leu Gly
 145 150 155 160
 Phe Asp Tyr Pro Ala Arg Thr Val Asn Val Tyr Phe Asn Asp Val Pro
 165 170 175
 Arg Glu Cys Phe Glu Pro Glu Thr Ile Arg Ser Thr Leu Arg Arg Thr
 180 185 190
 Gly Met Ala Glu Pro Ser Glu Gln Met Leu Arg Leu Gly Thr Gly Ala
 195 200 205
 Phe Gly Leu Tyr Val Thr Leu Gly Trp Asp Ser Pro Glu Ile Glu Arg
 210 215 220
 Ile Cys Tyr Ala Ala Ala Thr Thr Asp Leu Thr Thr Leu Pro Val Pro
 225 230 235 240
 Val Glu Pro Glu Ile Glu Lys Phe Val Lys Ser Val Pro Tyr Gly Gly
 245 250 255
 Gly Asp Arg Lys Phe Val Tyr Gly Val Ala Leu Thr Pro Lys Gly Glu
 260 265 270
 Tyr Tyr Lys Leu Glu Ser His Tyr Lys Trp Lys Pro Gly Ala Val Asn
 275 280 285
 Phe Ile
 290

<210> 23

<211> 873

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 23

gtggccgagc tctactcgac catcgaggaa tcggcccggc aactggacgt gccgtgttcg 60

cgcgaccggg tctggcccat cctgtccgcg tacggcgacg cgttcgccca tcccaggcg 120

gtggtcgcct tccgggtggc gaccgcgctg cgtcacgcgg gcgagctgga ctgccggttc 180

cggacgcata cggacgaccg ggaccgtac gcctcggcgc tcgcccgggg cctcaccgcc 240

cgcacggacc acccgcgcg cgcgctgctc tccgaggtcc accggcgctg cccggtggag 300

agccacggca tcgacttcgg ggtggtcggc ggcttcaaga agatctacgc ggccttcgcc 360

ccggacgagc tgcaggtggc cacgtcgctc gccggcattc cggcgatgcc ccgcagcctc 420
 gccgcgaacg ccgacttctt caccgggcac ggctcgacg accgggtcgg cgtgctggga 480
 ttcgactacc cggcccggac cgtgaacgtc tacttcaacg acgtgcccg tgagtgttc 540
 gagccggaga ccatccggtc gacgctgctc cggaccggga tggccgagcc gagcgagcag 600
 atgctccggc tcggcaccgg ggcggtcggg ctctacgtca cgctgggctg ggactccccg 660
 gagatcgagc ggatctgcta cgccgcgggc accacggacc tgaccacgt tccggtaccc 720
 gtggaaccgg agatcgagaa gtctgtgaaa agcgttccgt acggcggcgg ggaccggaag 780
 ttcgtctacg gcgtggcgct gacccccaa ggggagtact acaaactcga gtcgcactac 840
 aaatggaagc cgggcgcggt gaacttcatt tga 873

<210> 24
 <211> 370
 <212> PRT
 <213> Micromonospora sp. strain 046-ECO11

<400> 24

Val Trp Ala Arg Val Lys Asn Trp Val Val Ala Leu Ala Val Ala Ala
 1 5 10 15
 Val Leu Met Ile Ser Ala Leu Ala Gly Asp His Pro Ala Pro Glu Gly
 20 25 30
 Leu Gly Leu Leu Gly Phe Ala Leu Val Ala Ala Ser Gly Leu Ala Leu
 35 40 45
 Ala Ala Ser Arg Arg Ala Pro Ile Ala Val Leu Val Ala Thr Gly Leu
 50 55 60
 Cys Val Val Gly Tyr Asn Ala Ile Gly Phe Gly Val Pro Ala Ile Ala
 65 70 75 80
 Tyr Leu Phe Ala Val Tyr Ala Ala Val Arg Ala Gly His Arg Leu Val
 85 90 95
 Thr Leu Gly Ala Ser Ala Ala Leu Leu Val Val Leu Pro Leu Ala Ile
 100 105 110
 Met Val Ser Pro Ala Asp Gly Ala Leu Lys Glu Ala Leu Ala Gln Ser
 115 120 125
 Arg Gly Val Leu Glu Leu Ala Trp Leu Ile Ala Ala Ala Ala Gly
 130 135 140
 Glu Ala Leu Arg Gln Ala Glu Arg Arg Ala Asp Glu Ala Glu Arg Thr
 145 150 155 160

Arg Glu Glu Thr Ala Arg Leu Arg Ala Thr Gln Glu Arg Leu His Ile
 165 170 175
 Ala Arg Glu Leu His Asp Ser Leu Thr His Gln Ile Ser Ile Ile Lys
 180 185 190
 Val Gln Ala Glu Val Ala Val His Leu Ala Arg Lys Arg Gly Glu Gln
 195 200 205
 Val Pro Glu Ser Leu Leu Ala Ile Gln Glu Ala Gly Arg Ala Ala Thr
 210 215 220
 Arg Glu Leu Arg Ala Thr Leu Glu Thr Leu Arg Asp Leu Thr Lys Ser
 225 230 235 240
 Pro Ser His Gly Leu Asp His Leu Pro Glu Leu Leu Ala Gly Ala Glu
 245 250 255
 Lys Ile Gly Leu Ala Thr Thr Leu Thr Ile Glu Gly Asp Gln Arg Asp
 260 265 270
 Val Pro Glu Ala Val Gly Arg Thr Ala Tyr Arg Ile Val Gln Glu Ser
 275 280 285
 Leu Thr Asn Thr Ala Arg His Ala Ser Ala Ala Ala Ala Val Arg
 290 295 300
 Ile Asp Tyr Arg Pro Asp Ala Leu Ser Ile Arg Ile Asp Asp Asp Gly
 305 310 315 320
 Thr Ala Arg Pro Gly Ala Ala Pro Val Pro Gly Val Gly Leu Leu Gly
 325 330 335
 Met His Glu Arg Val Leu Ala Leu Gly Gly Arg Leu Arg Ala Glu Pro
 340 345 350
 Arg Thr Gly Gly Gly Phe Thr Val Gln Ala Glu Leu Pro Val Val Arg
 355 360 365
 Val Pro
 370

<210> 25
 <211> 1113
 <212> DNA
 <213> Micromonospora sp. strain 046-EC011

<400> 25
 gtgtgggccc ggggtgaagaa ctgggtcgtc gcgttggtg tggcggcggt gctgatgac 60
 agegcgctgg ccggtgacca tctgcccc gagggcctcg gtctgctcg cttcgcgctg 120
 gtggcggcga gcggcctggc gctggccgcc agtcgtcggg ccccgatcgc cgtgctggtc 180
 gccaccgggc tgtgcgtggt gggctacaac gcgatcggct tcggggtgcc cgccatcgcg 240
 tacctgttcg cgggtctacg ggcggtccgg gccgggcacc ggctcgtcac gctcggggcg 300

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agcgccgccc tgctcgctgt cctgccgctg gcgatcatgg tctcgcccgc ggacggcgcc 360
ctcaaggagg cgctcgcgca gtcgcggggc gtgctggaac tggcctggct gatcgccgcg 420
gcggcgggccg gtgaggcgct gcggcaggcc gaacggcgag cggacgaggc ggaacggacc 480
cgcgaggaga ccgcccggct gcgcgccacc caggagcggc tgcacatcgc acgggagctg 540
cacgactcgc tcaccacca gatctcgatc atcaagggtg aggcggaggt ggcgggtccac 600
ctggcccgcga agcggggcgga gcaggtgccg gagtcgctgc tggcgatcca ggaggccggc 660
cgggcgggcga ctgcgcgagct gcgcgcgacc ctggagacgc tgcgtgacct gaccaagtcc 720
ccgtcgcacg ggctcgacca cctcccggag ctgctggccg gggccgagaa gatcggcctg 780
gccaccacgc tgaccatcga gggcgaccag cgggacgtgc cggaggcggg gggccgcacc 840
gcgtaccgga tcgtgcagga gtcgctcacc aacaccgccc ggcacgcctc cgccgcgggc 900
gccgcggtcc ggatcgacta ccgcccggac gcgctgagca tccggatcga cgacgacggg 960
acggccccggc cgggcgcgcgc cccggtgccc ggcgtcgggc tgctggggat gcacgagcgc 1020
gtcctcgcgc tgggcggccg gctgcgggcg gaaccccgca ccggcggagg cttcaccgtc 1080
caggccgaac tcccgtggt gcgcgtccca tga 1113

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<210> 26
<211> 220
<212> PRT
<213> Micromonospora sp. strain 046-EC011

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<400> 26
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Met Ile Arg Ile Met Leu Leu Asp Asp Gln Pro Leu Leu Arg Ser Gly
1           5           10           15
Phe Arg Ala Leu Leu Asp Ala Glu Asp Asp Ile Glu Val Val Ala Glu
20          25          30
Gly Gly Asn Gly Arg Glu Gly Leu Ala Leu Ala Arg Gln His Leu Pro
35          40          45
Asp Leu Ala Leu Ile Asp Ile Gln Met Pro Val Met Asp Gly Val Glu
50          55          60
Thr Thr Arg Gln Ile Val Ala Asp Pro Ala Leu Ala Gly Val Arg Val
65          70          75          80
Val Ile Leu Thr Asn Tyr Gly Leu Asp Glu Tyr Val Phe His Ala Leu
85          90          95
Arg Ala Gly Ala Thr Gly Phe Leu Val Lys Asp Ile Glu Pro Asp Asp
100         105         110

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Leu Leu His Ala Val Arg Val Ala Ala Arg Gly Asp Ala Leu Leu Ala
 115 120 125
 Pro Ser Ile Thr Arg Met Leu Ile Asn Arg Tyr Val Ser Glu Pro Leu
 130 135 140
 Cys Ala Asp Val Thr Pro Gly Met Glu Glu Leu Thr Asn Arg Glu Arg
 145 150 155 160
 Glu Ala Val Ala Leu Ala Ala Arg Gly Leu Ser Asn Asp Glu Ile Ala
 165 170 175
 Asp Arg Met Val Ile Ser Pro Leu Thr Ala Lys Thr His Val Asn Arg
 180 185 190
 Ala Met Thr Lys Leu Gln Ala Arg Asp Arg Ala Gln Leu Val Val Phe
 195 200 205
 Ala Tyr Glu Ser Gly Leu Val Ser Pro Gly Asn Arg
 210 215 220

<210> 27

<211> 663

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 27

atgatcagga tcatgctgct cgacgaccag ccgctgctgc gcagcggggtt ccgcgcgctc 60
 ctcgacgccg aggacgacat cgaggtggtg gccgagggcg ggaacggccg ggagggcctg 120
 gcgctggccc ggcagcacct gccgatctc gccctgatcg acatccagat gccggtcatg 180
 gacggcgctc agacgacccg gcagatcgtc gcggatccgg cgctggccgg ggtacgcgtc 240
 gtcacctca ccaactacgg cctcgacgag tacgtcttcc acgcgctgcg cgccggcgcc 300
 accggcttcc tgggtcaagga catcgagccg gacgacctgc tgcacgccgt gcgggtcgcc 360
 gcgcgcggtg acgcgctgct cgcgccgctc atcaccgga tgctgatcaa caggtacgtg 420
 tcggagccgc tctgcgcgga cgtcacgccc ggcattggagg agctgacca cggggaacgc 480
 gagggcgtcg ccctggccgc ccggggcctg tccaacgacg agatcgccga tcgcatggtg 540
 atcagccgc tgaccgcgaa gaccacgctc aaccgcgcca tgaccaagct gcaggcccgc 600
 gaccgcgcc agctggtggt gttcgctac gagtccggcc tgggtgcacc cggcaatcgc 660
 tga 663

<210> 28

<211> 131

<212> PRT

<213> Micromonospora sp. strain 046-EC011

<400> 28

Met Phe Ile Arg Arg Leu Leu Thr Ala Ala Ala Ala Gly Val Leu Gly
1 5 10 15

Gly Leu Ala Leu Val Ala Pro Ala Ala Ala Gln Val Thr Ala Ala Asp
20 25 30

Gly Asp Gly Gly Ser Gly Arg Ala Gly Ser Val Leu Ala Leu Ala Leu
35 40 45

Ala Leu Leu Gly Leu Val Leu Gly Gly Trp Ala Leu Arg Ser Ala Gly
50 55 60

Arg Gly Gly Gly Arg Gly Asn Ala Ile Ala Ala Leu Val Leu Ala Val
65 70 75 80

Ala Gly Leu Ile Ala Gly Val Val Ala Leu Ala Gly Ser Asp Gly Gly
85 90 95

Val Gly Ser Gly Asn Gly Arg Gly Gly Ala Ile Val Ala Val Val Leu
100 105 110

Ala Leu Ile Gly Ile Ala Val Gly Gly Leu Ala Phe Thr Arg Ser Arg
115 120 125

Arg Ala Ala
130

<210> 29

<211> 396

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 29

atgttcatcc gtcgtttgct caccgccgcc gcagccggcg tcctcggtgg gctcgcactc 60

gtcgcaccgg cggccgcgca ggtgacggcc gccgacggtg acggtgggtc cggccgcgcc 120

ggatccgtgc tggcgctcgc gctcgcgttg ctccggcctcg tcctggggcg gtgggcgttg 180

cgctccgcgg ggcgcggcgg cggtcgtggc aacgcgatcg ccgcgctggt gctcgcggtg 240

gccggcctga tcgccggcgt ggtcgccctg gccggctccg acggtggtgt cggcagcggc 300

aacggccgtg gtggcgccat cgtggccgctc gtgctggcgc tgatcgggat cgccgtcggc 360

ggcctggcat tcaccgctc ccggcgcgcc gcctga 396

<210> 30

<211> 154

<212> PRT

<213> Micromonospora sp. strain 046-EC011

<400> 30

Met Arg Lys Val Phe Ala Gly Leu Ala Ala Phe Leu Leu Leu Val Leu
 1 5 10 15
 Val Val Gln Phe Phe Leu Ala Ala Ser Gly Ala Phe Ser Asn Glu Ala
 20 25 30
 Asn Glu Glu Ala Phe Arg Pro His Arg Ile Leu Gly Leu Gly Ser Ile
 35 40 45
 Leu Val Ala Val Val Leu Thr Val Ala Ala Ala Val Met Arg Met Pro
 50 55 60
 Gly Arg Ile Ile Gly Leu Ser Gly Leu Val Ala Gly Leu Gly Ile Leu
 65 70 75 80
 Gln Ala Leu Ile Ala Val Ile Ala Lys Ala Phe Gly Asp Ser Ala Gly
 85 90 95
 Asp Ser Ala Val Gly Arg Tyr Val Phe Gly Leu His Ala Val Asn Gly
 100 105 110
 Leu Val Met Val Ala Val Ala Arg Val Ile Leu Arg Ser Val Arg Ala
 115 120 125
 Ala Pro Asp Thr Thr Thr Thr Pro Gly Val Asp Thr Thr Val Thr Gly
 130 135 140
 Pro Ala Ala Asp Ser Ala Arg Thr Ala Ser
 145 150

<210> 31
 <211> 465
 <212> DNA
 <213> Micromonospora sp. strain 046-EC011

<400> 31
 atgcgcaaag tgttcgccgg actggcagcg ttcctgctgc tcgtgctcgt ggtgcagttc 60
 ttcctggccg ccagcggcgc gttcagcaac gaggccaacg aggaggcgtt ccgccctcac 120
 cggatcctgg gcctggggag catcctcgtc gccgtggtgc tgacgggtggc cgccgcggtg 180
 atgcggatgc ccggccggat catcggcctg tccggcctgg tcgccgggct gggcatcctg 240
 caggccctga tcgcggtcat cgccaaggcg ttcggcgact cggccggtga ctcggccgtc 300
 ggccggtacg tgttcggcct gcacgcggtc aacggactgg tgatgggtggc cgtcgcccgc 360
 gtcacatcctgc gcagcgtccg ggcggcgccg gacacgacca ccacgcccgg cgtggacacg 420
 acggtcaccg gtccggcggc cgactcggcg cgaacggcgt catga 465

<210> 32
 <211> 661
 <212> PRT

<213> Micromonospora sp. strain 046-EC011

<400> 32

Met Ser Thr Leu Gln Trp Ile Leu Val Asp His Val Val Ala Leu Leu
1 5 10 15
Gly Val Ala Thr Trp Phe Ala Thr Gly Val Thr Ala Ala Leu Gly Arg
20 25 30
His Arg Ile Ala Leu Ala Leu Leu Gly Ala Ala Val Leu Val Thr Val
35 40 45
Ala Arg Leu Gly Thr Val Ala Leu Leu Ala Asp Arg Gly Trp Trp Phe
50 55 60
Val Gln Glu Lys Val Leu Leu Gly Leu Pro Met Leu Gly Ala Ala Gly
65 70 75 80
Leu Val Ala Val Leu Leu Ala Gly Pro Arg Leu Leu Ala Ala Arg Gln
85 90 95
Ser Pro Ala Ala Asp Leu Pro Ala Gly Ala Leu Val Ala Val Leu Thr
100 105 110
Ala Gly Phe Ala Ala Leu Ala Gly Leu Val Val Thr Phe Thr Ala Gly
115 120 125
Tyr Pro Leu Thr Trp Ser Thr Ala Leu Ile Ala Val Ala Leu Val Cys
130 135 140
Ala Ala Ala Leu Leu Thr Ala Arg Val Val Gly Arg Pro Ala Ala Pro
145 150 155 160
Ala Ala Glu Ala Gly Ser Pro Glu His Thr Pro Ala Ala Ala Gly Pro
165 170 175
Thr Ala Leu Ser Arg Arg Arg Phe Leu Gly Val Ala Gly Gly Val Val
180 185 190
Ala Ala Gly Ala Gly Ala Thr Gly Val Gly Leu Leu Phe Arg Asp Pro
195 200 205
Glu Ala Met Val Thr Gly Gly Gly Pro Gly His Ala Gly Gly Ala Arg
210 215 220
Pro Lys Val Ser Val Ala Asp Leu Arg Gly Pro Gly Ala Pro Ala Ala
225 230 235 240
Gly Gly Thr Ala Arg Arg His Val Leu Thr Ala Arg Thr Gly Thr Val
245 250 255
Thr Ile Pro Ser Gly Arg Pro Ile Asp Ala Trp Ser Tyr Glu Gly Arg
260 265 270
Leu Pro Gly Pro Ala Ile Thr Ala Thr Glu Gly Asp Leu Ile Glu Val
275 280 285

Thr Leu Arg Asn Ala Asp Ile Glu Asp Gly Val Thr Val His Trp His
 290 295 300
 Gly Tyr Asp Val Pro Cys Gly Glu Asp Gly Ala Pro Gly Ala Thr Gln
 305 310 315 320
 His Ala Val Gln Pro Gly Gly Glu Phe Val Tyr Arg Phe Gln Ala Asp
 325 330 335
 Gln Val Gly Thr Tyr Trp Tyr His Thr His Gln Ala Ser His Pro Ala
 340 345 350
 Val Arg Lys Gly Leu Tyr Gly Thr Leu Val Val Thr Pro Arg Glu Asp
 355 360 365
 Arg Pro Glu Ala Glu Arg Gly Leu Asp Leu Thr Leu Pro Val His Thr
 370 375 380
 Phe Asp Asp Val Thr Ile Leu Gly Asp Gln Glu Gly Arg Ala Val His
 385 390 395 400
 Asp Val Arg Pro Gly Gln Pro Val Arg Leu Arg Leu Ile Asn Thr Asp
 405 410 415
 Ser Asn Pro His Trp Phe Ala Val Val Gly Ser Pro Phe Arg Val Val
 420 425 430
 Ala Val Asp Gly Arg Asp Leu Asn Gln Pro Gly Glu Val Arg Glu Val
 435 440 445
 Gly Leu Arg Leu Pro Ala Gly Gly Arg Tyr Asp Leu Thr Leu Ala Met
 450 455 460
 Pro Asp Ala Lys Val Thr Leu Leu Leu Asp Asn Asp Ser Asp Gln Gly
 465 470 475 480
 Val Leu Leu Arg Pro Pro Gly Val Gly Gly Gly Asp Arg Pro Leu Pro
 485 490 495
 Asp Thr Ala Asp Trp Pro Glu Phe Asp Leu Leu Gly Tyr Gly Glu Pro
 500 505 510
 Ala Pro Val Pro Phe Asp Ala Asp Asp Ala Asp Arg His Phe Thr Ile
 515 520 525
 Val Leu Asp Arg Ala Leu Ala Met Val Asp Gly Lys Pro Ala Tyr Ala
 530 535 540
 Gln Thr Val Asp Gly Arg Ala His Pro Ser Val Pro Asp Gln Leu Val
 545 550 555 560
 Arg Glu Gly Asp Val Val Arg Phe Thr Val Val Asn Arg Ser Leu Glu
 565 570 575
 Thr His Pro Trp His Leu His Gly His Pro Val Leu Ile Leu Ser Arg
 580 585 590

Asp Gly Arg Pro Tyr Ser Gly Ser Pro Leu Trp Met Asp Thr Phe Asp
595 600 605

Val Arg Pro Gly Glu Val Trp Glu Val Ala Phe Arg Ala Asp Asn Pro
610 615 620

Gly Val Trp Met Asn His Cys His Asn Leu Pro His Gln Glu Gln Gly
625 630 635 640

Met Met Leu Arg Leu Val Tyr Asp Gly Val Thr Thr Pro Phe Ala Ser
645 650 655

Thr Ser His Ala His
660

<210> 33
<211> 1986
<212> DNA
<213> Micromonospora sp. strain 046-EC011

<400> 33
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tggttcgcaa cgggtgtcac ggcagctctc ggccgccacc ggatcgcggt ggcgctcctc 120
ggcgccgcgg tgctggtgac agtcgcccgc ctggggcacc tggcgctgct ggccgaccgc 180
ggctggtggt tcgtccagga gaaggttctg ctggggctgc cgatgctcgg cgccgcgggg 240
ctcgtcgcgg tgctcctggc cggcccgcgc ctgctcgcgg cccggcagtc accggcgggc 300
gacctgccgg ccggcgcgct ggtcgcgggt ctgaccgccg gcttcgccgc gctggccggc 360
ctggtggtga cgttcaccgc cgggtaccgc ctgacgtgga gcaccgcgct gatcgccgtc 420
gccctcgtct gcgccgccgc gctgctcacc gcgcgggtgg tcggacgacc cgccgccccg 480
gccgcggagg ccggctcccc ggagcacacg ccggcgggcg ccgggcccac ggcgctgtcc 540
cgccgcgggt tcctcggcgt ggccggggga gtggtcgcgg cgggcgccgg cgccaccggc 600
gtcggcctgc tcttcgcga cccggaggcg atggtcaccg gaggcggccc cggacacgcc 660
ggtggcgccc gcccgaaggt ctccgtggcg gacctgcgcg gccccggcgc tccggcgggc 720
ggcggcacgg cgcgacgcca cgtgctcacc gcccggacgg gcaccgtcac gattccgtcc 780
ggacgtccga tcgacgcctg gagctacgag ggccgcctgc ccgggcccgc catcaccgcg 840
accgagggcg acctgatcga ggtgacgctc cgcaacgccg acatcgagga cggcgtcacc 900
gtgcactggc acgggtacga cgtgccgtgc ggcgaggacg gcgcgccggg cgccacgcag 960
cacgcggtgc agcccggcg cgagttcgtc taccggttcc aggcggacca ggtggggacg 1020
tactggtacc acaccacca ggcgtcgcac cccgccgtgc gcaaagggt gtacgggacg 1080

ctcgtcgtga cgccgcgcga ggaccggccg gaagcggagc gcgggctgga cctgacgctg 1140
ccggtgcaca cgttcgacga cgtcacgata ctcggcgacc aggagggacg cgccgtccac 1200
gacgtccgcc cgggccagcc ggtgcgactg cgtctgatca acaccgactc caaccgcac 1260
tggttcgccg tcgtcggtc gcccttcgc gtggtggccg tcgacggccg cgacctcaac 1320
cagccgggcg aggtacgcga ggtcgggctc cgctgcccg ccggaggccg gtacgacctg 1380
accctggcca tgccggacgc caaggtcacg ctgctgctcg acaacgactc cgaccagggc 1440
gtcctgctgc gcccgccggg cgtcggcggg ggtgaccgcc cgctgccgga caccgccgac 1500
tggtccgagt tcgacctgct gggctacggc gagccggcgc ccgtgccgtt cgacgccgac 1560
gacgccgacc gccacttcac catcgtcctc gaccgggccc tggccatggt cgacggcaag 1620
cccgcgtacg ccagaccgt cgacggtcgc gcacatccct ccgtccccga ccagctcgtc 1680
cgggaggggg acgtcgtgcg cttcacgggtg gtcaaccgga gcctcgaaac ccaccgtgg 1740
cacctgcacg gccatccggt gctgatcctg tcccgcgacg gccggccgta ctccggcagc 1800
ccgctgtgga tggacacctt cgacgtgcgg ccgggagagg tgtgggaggt ggcgttcgg 1860
gcggacaatc cgggtgtctg gatgaaccac tgccacaacc tgccgcacca ggagcagggc 1920
atgatgctgc ggctcgtcta cgacggtgtc accacgccct tcgccagcac gagccacgca 1980
cactga 1986

<210> 34
<211> 129
<212> PRT
<213> Micromonospora sp. strain 046-EC011

<400> 34

Met	Thr	Ala	Asp	Leu	His	Gly	Leu	Ala	Ser	Val	Arg	Tyr	Ile	Val	Asp
1				5					10					15	
Asp	Val	Ser	Ala	Ala	Ile	Glu	Phe	Tyr	Thr	Thr	His	Leu	Gly	Phe	Thr
			20					25					30		
Val	Ser	Thr	Ala	Phe	Pro	Pro	Ala	Phe	Ala	Asp	Val	Val	Arg	Gly	Pro
			35				40					45			
Leu	Arg	Leu	Leu	Leu	Ser	Gly	Pro	Thr	Ser	Ser	Gly	Ala	Arg	Val	Thr
	50					55					60				
Pro	Ala	Asp	Ala	Ala	Gly	Cys	Gly	Arg	Asn	Arg	Ile	His	Leu	Ile	Val
65					70				75					80	
Asp	Asp	Leu	Asp	Ala	Glu	Arg	Glu	Arg	Leu	Glu	Arg	Ala	Gly	Val	Thr

			85						90					95			
Leu	Arg	Ser	Asp	Val	Val	Ala	Gly	Pro	Gly	Gly	Arg	Gln	Phe	Leu	Ile		
			100					105					110				
Ala	Asp	Pro	Ala	Gly	Asn	Leu	Val	Glu	Val	Phe	Glu	Pro	Ala	Ala	Arg		
		115					120					125					

Gly

<210> 35
 <211> 390
 <212> DNA
 <213> Micromonospora sp. strain 046-ECO11

<400> 35
 atgaccgcag acctgcacgg cctggccagc gtccgctaca tcgtcgacga cgtgtcggcg 60
 gcgatcgagt tctacaccac ccacctgggt ttcacgggtg cgaccgcgtt cccgccggcc 120
 ttccgccgacg tgggtgcgcgg gccgctgcgg ctctgtctgt ccggggccgac cagctcgggc 180
 gcccggttca ccccgccgga cgcgccgggg tgcggggcgca accgcatcca cctgatcgtc 240
 gacgatctcg acgccgaacg ggagcggctg gagcgcgccg gggtgacgtt gcgcagcgac 300
 gtcgtggccg ggccggggcg ccgtcagttc ctgatcgccg acccggcggg caacctggtc 360
 gaggtgttcg agccggcagc ccgcggctga 390

<210> 36
 <211> 178
 <212> PRT
 <213> Micromonospora sp. strain 046-ECO11

<400> 36

Met	Leu	Thr	Ala	Val	Val	Ala	Ser	Pro	His	Ser	Pro	Glu	Asn	Thr	Ser
1				5					10					15	
Arg	His	Pro	Thr	Gly	Gly	Asp	Ala	Val	Asp	Glu	Ala	Thr	Pro	Arg	Thr
			20					25					30		
Pro	Val	Ala	Ala	Arg	Pro	Thr	Trp	Ser	Pro	Ala	Thr	Ala	Pro	Val	Trp
		35					40					45			
Leu	Val	Gly	Val	Leu	Ala	Thr	Leu	Ala	Gly	Ala	Val	Ala	Ala	Glu	Ala
		50				55					60				
Phe	Thr	Leu	Ala	Ala	Arg	Gly	Phe	Gly	Val	Pro	Met	Glu	Ala	Ala	Gly
65					70					75				80	
Val	Trp	Glu	Glu	Gln	Ala	Gln	Ala	Ile	Pro	Val	Gly	Ala	Ile	Ala	Arg
				85					90					95	

Ser Val Val Leu Trp Ser Ile Gly Gly Ile Val Leu Ala Val Val Val
100 105 110

Ala Arg Arg Ala Arg Arg Pro Val Arg Ala Phe Val Ala Gly Thr Val
115 120 125

Ala Phe Thr Val Leu Ser Leu Ala Ala Pro Ala Phe Ala Arg Asp Thr
130 135 140

Pro Val Ser Thr Gln Leu Val Leu Ala Gly Thr His Val Ile Ala Gly
145 150 155 160

Ala Val Ile Ile Ser Ile Leu Ala Ala Arg Leu Ala Ala Pro Thr Pro
165 170 175

Pro Arg

<210> 37
<211> 537
<212> DNA
<213> Micromonospora sp. strain 046-EC011

<400> 37
atgttgactg ccgtcgtggc gtccccgcat tctcccgaga acacatcgag gcacccgacc 60
ggaggcgacg ccgtggatga ggccactccc cgaactcccg tcgcggcacg gccacactgg 120
tcgccggcca ccgctccggt gtggctggtc ggcgtgctgg ccaccctcgc cggggccgtg 180
gccgcgaggg cggttcacgt cgccgcccgg ggcttcggcg taccgatgga ggcggccggc 240
gtctgggagg agcaggcgca ggcgatcccg gtgggggcca tcgcccgcag cgtcgtgctc 300
tggtcgatcg gcggaatcgt cctggcggtg gtcgtggcgc ggcgggcccg gcggcccgtg 360
cgtgccttcg tggccggcac cgtcgcgttc accgtgctgt ccctcgccgc gccgccttc 420
gcccgggaca ccccggtgtc gacgcagctc gtcctcgccg gcacccacgt gatcgccggc 480
gccgtgatca tctccatcct ggccgcgcgg ctgcgccgc ccaccccgcc ccggtaa 537

<210> 38
<211> 661
<212> PRT
<213> Micromonospora sp. strain 046-EC011

<400> 38

Met Asp Gly Thr Glu Ser Asn Val Thr Gly Phe Pro Asp Leu Leu Ser
1 5 10 15

Gly Leu Gly Gly Asp Gly Arg Ala Phe Ala Leu Leu His Arg Pro Gly
20 25 30

Ala Ala Gly Cys Ala Tyr Val Glu Val Leu Thr Gly Glu Val Cys Asp

35					40					45					
Val	Asp	Thr	Leu	Gly	Glu	Leu	Pro	Leu	Pro	Thr	Glu	Pro	Ala	Thr	Gly
50					55					60					
Ala	Arg	His	Asp	Leu	Leu	Val	Ala	Val	Pro	Tyr	Arg	Gln	Val	Thr	Glu
65				70					75						80
Arg	Gly	Phe	Asp	Cys	His	Asp	Asp	Gly	Ala	Pro	Leu	Leu	Ala	Met	Arg
				85				90					95		
Val	His	Glu	Gln	Phe	Gly	Leu	Asp	Arg	Gly	Gln	Ala	Leu	Ala	Gly	Leu
			100					105					110		
Pro	Glu	Arg	Gly	Val	Pro	Val	Thr	Asp	Ala	Asp	Phe	Asp	Leu	Ser	Asp
			115				120					125			
Glu	Asp	Tyr	Ala	Ala	Ile	Val	Lys	Arg	Val	Val	Gly	Asp	Glu	Ile	Gly
					135						140				
Leu	Gly	Ala	Gly	Ser	Asn	Phe	Val	Ile	Arg	Arg	Thr	Phe	Thr	Ala	Arg
145				150					155						160
Leu	Ala	Asp	Tyr	Ser	Ile	Ala	Thr	Glu	Leu	Ala	Leu	Phe	Arg	Arg	Leu
				165				170					175		
Leu	Thr	Gly	Glu	Leu	Gly	Ser	Tyr	Trp	Thr	Phe	Leu	Phe	His	Ser	Gly
			180					185					190		
Ala	Gly	Thr	Phe	Ile	Gly	Ala	Ser	Pro	Glu	Arg	His	Val	Ser	Met	Ile
			195				200					205			
Asp	Gly	Thr	Val	Ser	Met	Asn	Pro	Ile	Ser	Gly	Thr	Tyr	Arg	His	Pro
			210			215					220				
Pro	Asn	Gly	Pro	Ala	Val	Ser	Gly	Leu	Leu	Glu	Phe	Leu	Asn	Asp	Pro
225				230						235					240
Lys	Glu	Ala	Asn	Glu	Leu	Tyr	Met	Val	Val	Asp	Glu	Glu	Leu	Lys	Met
				245				250						255	
Met	Ala	Arg	Met	Cys	Ala	Ser	Gly	Gly	Gln	Val	His	Gly	Pro	Phe	Leu
			260					265					270		
Lys	Glu	Met	Ala	Arg	Val	Thr	His	Ser	Glu	Tyr	Ile	Leu	Thr	Gly	Arg
			275				280					285			
Ser	Asp	Leu	Asp	Val	Arg	Asp	Val	Leu	Arg	Glu	Thr	Leu	Leu	Ala	Pro
			290			295					300				
Thr	Val	Thr	Gly	Ser	Pro	Ile	Glu	Asn	Ala	Phe	Arg	Val	Ile	Thr	Arg
305				310					315						320
His	Glu	Thr	Thr	Gly	Arg	Gly	Tyr	Tyr	Gly	Gly	Val	Leu	Ala	Leu	Met
				325					330					335	
Gly	Arg	Asp	Ser	Ala	Gly	Ser	Arg	Thr	Leu	Asp	Ser	Ala	Ile	Met	Ile

340					345					350					
Arg	Thr	Ala	Glu	Ile	Asp	Asp	Ala	Gly	Thr	Leu	Arg	Leu	Gly	Val	Gly
		355					360					365			
Ala	Thr	Leu	Val	Arg	Asp	Ser	Lys	Pro	Glu	Ser	Glu	Val	Ala	Glu	Thr
		370				375					380				
Arg	Ala	Lys	Ala	Gly	Ala	Met	Arg	Ala	Ala	Leu	Gly	Leu	Gly	Val	Asp
385					390					395					400
Pro	Asp	Gly	Pro	Asp	Gly	Gly	Arg	Thr	Thr	Ala	Ala	Arg	Ala	Arg	Ser
				405					410					415	
Ser	Leu	Ala	Thr	Asp	Pro	Arg	Val	Arg	Arg	Ala	Leu	Arg	Glu	Arg	Asn
			420					425					430		
Thr	Thr	Leu	Ser	Arg	Phe	Trp	Leu	Asp	Gly	Ala	Glu	Arg	Arg	Thr	Pro
		435					440					445			
Asn	Pro	Ala	Leu	Thr	Gly	Arg	Arg	Val	Leu	Val	Val	Asp	Asn	Glu	Asp
	450					455					460				
Thr	Phe	Met	Ala	Met	Leu	Asp	His	Gln	Leu	Arg	Ala	Leu	Gly	Leu	Arg
465					470					475					480
Ser	Ser	Ile	Ala	Arg	Phe	Asp	Ser	Arg	Leu	Arg	Pro	Asp	Gly	His	Asp
				485					490					495	
Leu	Val	Val	Val	Gly	Pro	Gly	Pro	Gly	Asp	Pro	Gly	Asp	Leu	Thr	Asp
			500					505					510		
Pro	Arg	Met	Arg	Thr	Leu	Arg	Gly	Leu	Thr	Arg	Asp	Leu	Leu	Ala	Gly
		515					520					525			
Thr	Val	Pro	Phe	Leu	Ser	Ile	Cys	Leu	Gly	His	Gln	Val	Leu	Ala	Ala
		530				535					540				
Glu	Leu	Gly	Phe	Pro	Leu	Ala	Arg	Arg	Ala	Val	Pro	Asn	Gln	Gly	Val
545					550					555					560
Gln	Lys	Arg	Ile	Asp	Leu	Phe	Gly	Arg	Pro	Glu	Leu	Val	Gly	Phe	Tyr
				565					570					575	
Asn	Thr	Tyr	Thr	Ala	Arg	Ser	Ala	His	Asp	Val	Val	Ala	Gly	Gly	Arg
			580					585					590		
Arg	Gly	Pro	Ile	Glu	Ile	Ser	Arg	Ser	Pro	Asp	Ser	Gly	Asp	Val	His
		595					600					605			
Ala	Leu	Arg	Gly	Pro	Gly	Phe	Arg	Ser	Val	Gln	Phe	His	Leu	Glu	Ser
		610				615					620				
Val	Leu	Thr	Gln	His	Gly	Pro	Arg	Ile	Leu	Gly	Asp	Leu	Leu	Val	Ser
625					630					635					640
Leu	Leu	Ala	Asp	Gly	Thr	Ala	Ala	Ala	Ala	Ala	Glu	Ala	Ala	Gly	Arg

	645	650	655	
Arg Gly Asn Arg Pro				
660				
<210> 39				
<211> 1986				
<212> DNA				
<213> Micromonospora sp. strain 046-EC011				
<400> 39				
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gttctgaccg gcgaggtgtg cgacgtggac actctcggcg agctgccctt gccaccgag				180
ccggcgaccg gcgcgcgga cgacctgctc gtggcggtgc cgtaccggca ggtcaccgaa				240
cgggggttcg actgccacga cgacggcgcg ccgctgctcg cgatgcgegt ccacgagcag				300
ttcgggctcg acccgggaca ggcgctggcg ggccctgccg aacgcggtgt gccggtgacc				360
gacgccgact tcgacctcag cgacgaggac tacgccgcga tcgtcaagcg ggtggtgggt				420
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ctgggttcct actggacgtt tctgttccac tccggcgccg gcacgttcat cggcgcgta				600
ccggaacgac acgtcagcat gatcgacgga accgtctcga tgaatcccat cagcgggacc				660
taccggcacc ccccgaacgg cccggccgtt tccggtctgc tggaattcct gaacgaccg				720
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tgcgctccg gcggccaggt gcacggcccc ttctcaagg aaatggcgcg ggtgacgcac				840
tccgagtaca tcctgaccgg ccgcagcgac ctggacgtgc gcgacgtgct gcgggagacc				900
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gccggcagcc gtacgctcga ctcggccatc atgatccgca ccgccgagat cgacgacgcg				1080
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gacggcgcgg agcggcgcac cccgaaccg gcgctgaccg gacgccgcgt gctcgtcgtc				1380

gacaacgagg acacgttcat ggccatgctc gaccaccagt tgcgggccct cgggctgcgg 1440
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ggccccggcc cgggcgaccc gggcgacctg accgaccgcg gtatgcggac cctgcgcggg 1560
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cacctggagt ccgtcctcac ccagcacggc ccacggatcc tgggcgacct gctggtctcc 1920
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ccgtga 1986

<210> 40
<211> 427
<212> PRT
<213> Micromonospora sp. strain 046-EC011

<400> 40

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Leu	Gln	Thr	Leu	Asp	Arg	Val	Arg	His	Ala	Ala	Leu	Arg	Ile	Ala	Glu	20	25	30	
Ala	Arg	Arg	His	Gly	Ser	Ala	Val	Thr	Val	Val	Val	Ser	Ala	Arg	Gly	35	40	45	
Ser	Arg	Thr	Asp	Asp	Leu	Leu	Arg	Leu	Ala	Ala	Asp	Val	Gly	Ala	Ala	50	55	60	
Gly	Pro	Ser	Arg	Glu	Leu	Asp	Gln	Leu	Leu	Ala	Val	Gly	Glu	Ser	Glu	65	70	75	80
Ser	Ala	Ala	Leu	Met	Ala	Leu	Ala	Leu	Thr	Gly	Leu	Gly	Val	Pro	Ala	85	90	95	
Val	Ser	Leu	Thr	Gly	His	Gln	Ala	Glu	Ile	His	Thr	Thr	Asp	Arg	His	100	105	110	
Gly	Asp	Ala	Leu	Ile	Ser	Arg	Ile	Gly	Ala	Ala	Arg	Val	Glu	Ala	Ala	115	120	125	
Leu	Gly	Arg	Gly	Glu	Val	Ala	Val	Val	Thr	Gly	Phe	Gln	Gly	Ile	Asp	130	135	140	

Arg	Ala	Gly	Asp	Val	Ala	Thr	Leu	Gly	Arg	Gly	Gly	Ser	Asp	Thr	Thr	
145					150					155					160	
Ala	Val	Ala	Leu	Ala	Ala	Arg	Leu	Arg	Ala	Ser	Ala	Cys	Glu	Ile	Tyr	
			165						170					175		
Thr	Asp	Val	Asp	Gly	Val	Phe	Ser	Ala	Asp	Pro	Arg	Ile	Leu	Pro	Ala	
			180					185					190			
Ala	Arg	Cys	Leu	Pro	Trp	Val	Glu	Pro	Gly	Val	Met	Ala	Glu	Met	Ala	
		195					200					205				
Phe	Ala	Gly	Ala	Arg	Val	Leu	His	Thr	Arg	Cys	Ile	Glu	Leu	Ala	Ala	
	210					215					220					
Met	Glu	Gly	Val	Glu	Val	Arg	Val	Arg	Asn	Ala	Ser	Ser	Gln	Ala	Pro	
225					230					235					240	
Gly	Thr	Ile	Val	Val	Asp	Arg	Pro	Asp	Asp	Arg	Pro	Leu	Glu	Thr	Arg	
			245						250					255		
Arg	Ala	Val	Val	Ala	Val	Thr	His	Asp	Thr	Asp	Val	Val	Arg	Val	Leu	
			260					265					270			
Val	His	Cys	Arg	Asp	Gly	Arg	Arg	Asp	Met	Ala	Pro	Asp	Val	Phe	Glu	
		275					280					285				
Val	Leu	Ala	Ala	His	Gly	Ala	Val	Ala	Asp	Leu	Val	Ala	Arg	Ser	Gly	
	290					295					300					
Pro	Tyr	Glu	Ser	Glu	Phe	Arg	Met	Gly	Phe	Thr	Ile	Arg	Arg	Ser	Gln	
305					310					315					320	
Ala	Glu	Ala	Val	Arg	Thr	Ala	Leu	His	Asp	Leu	Thr	Ala	Ser	Phe	Asp	
				325					330					335		
Gly	Gly	Val	His	Phe	Asp	Glu	Asn	Val	Gly	Lys	Val	Ser	Val	Val	Gly	
			340					345					350			
Met	Gly	Leu	Leu	Ser	Arg	Pro	Glu	His	Thr	Ala	Arg	Leu	Met	Ala	Ala	
		355					360					365				
Leu	Ala	Ala	Ala	Gly	Ile	Ser	Thr	Ser	Trp	Ile	Ser	Thr	Ser	Gln	Met	
	370					375					380					
Arg	Leu	Ser	Val	Ile	Val	Ser	Arg	Asp	Arg	Thr	Val	Asp	Ala	Val	Glu	
385					390					395					400	
Ala	Leu	His	Arg	Ala	Phe	Arg	Leu	Asp	Arg	Ser	Glu	Pro	Ala	Asp	Ala	
			405					410						415		
Thr	Ser	Leu	Thr	Ser	Arg	Arg	Ser	Ala	Thr	Ala						
			420					425								

<210> 41
 <211> 1284
 <212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 41

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acagtgggtcg tgtcggcgcg cggcagccgg accgacgacc tgctgcggct ggcgggccgac      180
gtcggcgccg cgggtccgtc ccgggaactc gaccagttgc tcgcagtcgg cgagtccgag      240
tcggcgggcg tgatggcgct ggcgttgacc gggctgggag tgccggccgt ctcgctgacc      300
gggcaccagg cggagatcca caccaccgac cggcacggcg acgcgctgat ctccggtgac      360
ggggcgggcg ggggtggaagc ggcgctgggc cgtggcgagg tcgccgtggt caccggattc      420
cagggcatcg accgggcccg tgacgtcgcc acgctggggc gcggcgggctc cgacacgaca      480
gcggtggcgc tcgcggcccc gctccgcgcg tcggcggtgc agatctacac cgacgtggac      540
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cccgcgctca tggcgagat ggcgttcgcc ggcgcgcggg tcctgcacac ccgatgcac      660
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ggaacgatag tcgtggaccg gcccacgac cggccgctgg agaccggcg ggccgtggtg      780
gcggtcaccc acgacaccga tgtcgtccgc gtgctggtgc actgccgca cgcccgccgg      840
gacatggcac ccgacgtggt cgaggtgctg gccgcccatg gggcggtggc ggacctggtg      900
gcccgggtccg ggccctacga gagcgagttc cggatggggg tcaccatccg ccgcagccag      960
gccgaagcgg tcgggaccgc gctgcacgac ctaccgcgt ccttcgacgg cggggtccac     1020
ttcgacgaga acgtcgcaa ggtgtccgtg gtcggcatgg gcctgctcag ccgccccgag     1080
cacacggccc ggctgatggc ggcgctggcc gcggcgggga tctcgacgag ctggatctcc     1140
acctcccaga tcgggtgtc ggtgatcgtg tcgcgggacc gcaccgtcga cgccgtcgaa     1200
gccctgcacc gcgcgttccg cctggaccgg tccgagccgg cggacgccac gtccctgacc     1260
tcccgcggtt ccgccaccgc ctga                                             1284
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<210> 42

<211> 274

<212> PRT

<213> Micromonospora sp. strain 046-EC011

<400> 42

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1          5          10          15
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Leu Phe Arg Arg Gly Asp Gly Arg Leu Leu Val Val Pro Leu Asp His
 20 25 30
 Ser Val Thr Asp Gly Pro Leu Arg Arg Gly Asp Leu Asn Ser Leu Leu
 35 40 45
 Gly Glu Leu Ala Gly Thr Gly Val Asp Ala Val Val Leu His Lys Gly
 50 55 60
 Ser Leu Arg His Val Asp His Gly Trp Phe Gly Asp Met Ser Leu Ile
 65 70 75 80
 Val His Leu Ser Val Ser Thr Arg His Ala Pro Asp Pro Asp Ala Lys
 85 90 95
 Tyr Leu Val Ala His Val Glu Glu Ala Leu Arg Leu Gly Ala Asp Ala
 100 105 110
 Val Ser Val His Val Asn Leu Gly Ser Pro Gln Glu Ala Arg Gln Ile
 115 120 125
 Ala Asp Leu Ala Ala Val Ala Gly Glu Cys Asp Arg Trp Asn Val Pro
 130 135 140
 Leu Leu Ala Met Val Tyr Ala Arg Gly Pro Gln Ile Thr Asp Ser Arg
 145 150 155 160
 Ala Pro Glu Leu Val Ala His Ala Ala Thr Leu Ala Ala Asp Leu Gly
 165 170 175
 Ala Asp Ile Val Lys Thr Asp Tyr Val Gly Thr Pro Glu Gln Met Ala
 180 185 190
 Glu Val Val Arg Gly Cys Pro Ile Pro Leu Ile Val Ala Gly Gly Pro
 195 200 205
 Arg Ser Ala Asp Thr Pro Thr Val Leu Ala Tyr Val Ser Asp Ala Leu
 210 215 220
 Arg Gly Gly Val Ala Gly Met Ala Met Gly Arg Asn Val Phe Gln Ala
 225 230 235 240
 Glu Gln Pro Gly Leu Met Ala Ala Ala Val Ala Arg Leu Val His Glu
 245 250 255
 Pro Arg His Val Pro Asp Arg Tyr Asp Val Asp Asp Arg Leu Ala Leu
 260 265 270
 Thr Ser

<210> 43
 <211> 825
 <212> DNA
 <213> Micromonospora sp. strain 046-ECO11

<400> 43
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aagaccgact acgtgggcac gcccgagcag atggccgagg tgggtgcgcg ctgcccgatc 600
ccgctgatcg tggccggcg ccgcgctcg gccgacactc cgacggtgct cgctacgtc 660
tcggacgcgc tgcgcggcg cgtaggcggg atggccatgg gccgcaacgt gttccaggcc 720
gagcagcccg gcctgatggc cgccgccgtg gcacggctgg tgcacgagcc acggcacgtg 780
ccggaccggt acgacgtcga cgaccggctc gcccttacgt cctga 825

<210> 44
<211> 367
<212> PRT
<213> Micromonospora sp. strain 046-EC011

<400> 44
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20 25 30
Ala Asp Pro Ala Asp Leu Glu Thr Leu Pro Pro Thr Val Lys Lys Val
35 40 45
Leu Phe Pro Gln Gly Gly Pro Leu Pro Glu Lys Leu Glu Pro Ala Asp
50 55 60
Leu Val Ile Val Glu Pro Ala Arg His Gly Glu Pro Ala Glu Leu Ala
65 70 75 80
Ala Arg Tyr Pro Glu Val Glu Phe Gly Arg Phe Val Glu Ile Val Asp
85 90 95
Ala Asp Ser Leu Glu Asp Ala Cys Arg Ser Ala Arg His Asp Arg Trp
100 105 110

Ser Leu Leu Tyr Phe Arg Asp Pro Thr Lys Ile Pro Leu Glu Ile Val
 115 120 125
 Leu Ala Ala Ala Ala Gly Ala Glu Gly Ser Ile Ile Thr Gln Val Ala
 130 135 140
 Asp Val Glu Glu Ala Glu Ile Val Phe Gly Val Leu Glu His Gly Ser
 145 150 155 160
 Asp Gly Val Met Leu Ala Pro Arg Ala Val Gly Glu Ala Thr Glu Leu
 165 170 175
 Arg Thr Ala Ala Val Ser Thr Ala Ala Asp Leu Ser Leu Val Glu Leu
 180 185 190
 Glu Val Thr Gly Ile Arg Arg Val Gly Met Gly Glu Arg Ala Cys Val
 195 200 205
 Asp Thr Cys Thr Asn Phe Arg Leu Asp Glu Gly Ile Leu Val Gly Ser
 210 215 220
 His Ser Thr Gly Met Ile Leu Cys Cys Ser Glu Thr His Pro Leu Pro
 225 230 235 240
 Tyr Met Pro Thr Arg Pro Phe Arg Val Asn Ala Gly Ala Leu His Ser
 245 250 255
 Tyr Thr Leu Ser Ala Gly Gly Arg Thr Asn Tyr Leu Ser Glu Leu Val
 260 265 270
 Ser Gly Gly Arg Val Leu Ala Val Asp Ser Gln Gly Lys Ser Arg Val
 275 280 285
 Val Thr Val Gly Arg Val Lys Ile Glu Thr Arg Pro Leu Leu Ala Ile
 290 295 300
 Asp Ala Val Ser Pro Ser Gly Thr Arg Val Asn Leu Ile Val Gln Asp
 305 310 315 320
 Asp Trp His Val Arg Val Leu Gly Pro Gly Gly Thr Val Leu Asn Val
 325 330 335
 Thr Glu Leu Thr Ala Gly Thr Lys Val Leu Gly Tyr Leu Pro Val Glu
 340 345 350
 Lys Arg His Val Gly Tyr Pro Ile Asp Glu Phe Cys Ile Glu Lys
 355 360 365

<210> 45
 <211> 1104
 <212> DNA
 <213> Micromonospora sp. strain 046-EC011

<400> 45
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cttccccca cgggtgaagaa ggtgctgttc ccgcagggcg ggccgctgcc ggagaagctg 180
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accaggtcg ccgacgtcga ggaggcggag atcgtcttcg gcgtcctgga gcacggctcg 480
gacggagtga tgctggcgcc ccgcgccgtg ggggaggcca ccgagctcg gaccgcccg 540
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ctggtcggct cgcactccac cggcatgatc ctgtgctgca gcgagacgca tccgtgcg 720
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gacgagttct gcatcgagaa gtga 1104

<210> 46
<211> 253
<212> PRT
<213> Micromonospora sp. strain 046-EC011

<400> 46

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Pro Gly Ala Arg Glu Arg Leu Leu Ala Ala Leu Arg Glu Cys Gly Leu
20 25 30
Ala Arg Ala Val Val Cys Ala Gly Gly Thr Ile Asp Leu Asp Arg Leu
35 40 45
Ser Arg Gln Leu Val Thr Gly Gly His Val Glu Thr Asp Ala Asp Asn
50 55 60
Asp Ala Val Ala Ala Ala Cys Ala Gly Thr Asp Gly Arg Leu Val Pro

65		70		75		80
Phe Phe Phe	Ala Asn Pro His Arg Pro	Ala Glu Ala Tyr Arg	Ala Arg			
	85	90	95			
Ala Ala Glu	Phe Arg Gly Leu Glu Ile Ser Pro	Ala Val His Gly Val				
	100	105	110			
Ala Leu Thr	Asp Pro Arg Val Ala Asp Leu Val	Ala Val Ala Ala Glu				
	115	120	125			
Phe Asp His	Pro Val Tyr Val Val Cys Leu Asp	Arg Pro Gly Ala Gly				
	130	135	140			
Val Ala Asp	Leu Val Gly Leu Ser Arg Arg Phe	Pro Gln Val Ser Phe				
	145	150	155			160
Val Leu Gly	His Ser Gly Val Gly Asn Ile Asp	Leu Tyr Ala Leu Thr				
	165	170	175			
Leu Ile Gln	Asp Glu Pro Asn Ile Ser Leu Glu Thr	Ser Gly Gly Tyr				
	180	185	190			
Thr Cys Val	Ala Glu Ala Ala Leu Arg Arg Leu Gly	Asp Asp Arg Val				
	195	200	205			
Val Phe Gly	Ser Glu Tyr Pro Leu Gln His Pro	Ala Val Glu Leu Ala				
	210	215	220			
Lys Phe Gln	Ala Leu Arg Leu Pro Pro Glu Arg	Trp Arg Arg Ile Ala				
	225	230	235			240
Trp Asp Asn	Ala His Arg Leu Leu Gly Glu Glu Lys	Arg				
	245	250				

<210> 47

<211> 762

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 47

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ggcaccatcg acctggaccg gctgtccgc cagctcgtca ccggcggcca cgtcgagacc	180
gacgccgaca acgacgcggt ggcgggcgcc tgcgccggca ccgacggccg gctggtgccg	240
ttctttcttcg ccaaccgcga ccggccggcc gaggcgtacc gggccgcgc cgccgagttc	300
cgcggcctgg agatctcacc cgccgtccac ggcgtcgccc tgaccgacc gcgggtcgcc	360
gacctcgtgg ccgtggcggc ggagttcgac catccggtgt acgtggtctg cctggaccga	420
cccggcgcg gcgtggccga cctggtcggc ctgagccgcc ggttcccga ggtgagcttc	480

gtgctcgggc	acagcggcgt	cggcaacatc	gacctctacg	ccctgaccct	gatccaggac	540
gagccgaaca	tctcgctgga	gacctccggc	ggctacacct	gcgtggccga	ggcggcgcta	600
cgccgcctcg	gcgacgaccg	ggtggtgttc	ggctccgagt	accgcgtgca	gcacccggcc	660
gtggaactgg	ccaagttcca	ggcgttgcga	ctgccgccgg	agcggtgggc	gcggatcgcc	720
tgggacaacg	cgcacgcgact	gctaggagag	gagaagcggt	ga		762

Val 1	Ser	Glu	Pro	Ser 5	Ser	Ser	Leu	Pro	Arg 10	Leu	Gly	Gln	Trp	His 15	Gly
Leu	Glu	Asp	Leu 20	Arg	Arg	Leu	Gln	Glu 25	Lys	Gln	Leu	Ala	Glu 30	Thr	Phe
Thr	Trp	Ala 35	Ala	Arg	Ser	Pro	Phe 40	Tyr	Arg	Ala	Arg	Leu 45	Ala	Ser	Gly
Ala	Pro 50	Pro	Val	Thr	Pro	Ala 55	Asp	Leu	Ala	Asp	Leu 60	Pro	Leu	Thr	Thr
Lys 65	Gln	Asp	Leu	Arg	Asp 70	Asn	Tyr	Pro	Phe	Gly 75	Met	Leu	Ala	Val	Pro 80
Arg	Glu	Arg	Leu 85	Ala	Thr	Tyr	His	Glu 90	Ser	Ser	Gly	Thr	Ala	Gly 95	Lys
Pro	Thr	Pro	Ser 100	Tyr	Tyr	Thr	Ala	Glu 105	Asp	Trp	Thr	Asp	Leu 110	Ala	Glu
Arg	Phe 115	Ala	Arg	Lys	Trp	Ile	Gly 120	Met	Ser	Ala	Asp	Asp 125	Val	Phe	Leu
Val 130	Arg	Thr	Pro	Tyr	Ala	Leu 135	Leu	Leu	Thr	Gly	His 140	Leu	Ala	His	Ala
Ala 145	Ala	Arg	Leu	Arg	Gly 150	Ala	Thr	Val	Val	Pro	Gly	Asp	Asn	Arg	Ser 160
Leu	Ala	Met	Pro	Tyr 165	Ala	Arg	Val	Val	Arg 170	Val	Met	His	Asp	Leu 175	Asp
Val	Thr	Leu	Thr 180	Trp	Ser	Val	Pro	Thr 185	Glu	Cys	Leu	Ile	Trp 190	Ala	Ala
Ala	Ala	Ile 195	Ala	Ala	Gly	His 200	Arg	Pro	Asp	Ile	Asp	Phe 205	Pro	Ala	Leu

Arg Ala Leu Phe Val Gly Gly Glu Pro Met Thr Asp Ala Arg Arg Arg
 210 215 220
 Arg Ile Ser Arg Leu Trp Gly Val Pro Val Ile Glu Glu Tyr Gly Ser
 225 230 235 240
 Thr Glu Thr Gly Ser Leu Ala Gly Glu Cys Pro Glu Gly Arg Leu His
 245 250 255
 Leu Trp Ala Asp Arg Ala Leu Phe Glu Val Tyr Asp Pro Asp Thr Gly
 260 265 270
 Ala Val Arg Ala Asp Gly Asp Gly Gln Leu Val Val Thr Pro Leu Phe
 275 280 285
 Arg Glu Ala Met Pro Leu Leu Arg Tyr Asn Leu Glu Asp Asn Val Ser
 290 295 300
 Val Ser Tyr Asp Asp Cys Gly Cys Gly Trp Lys Leu Pro Thr Val Arg
 305 310 315 320
 Val Leu Gly Arg Ser Ala Phe Gly Tyr Arg Val Gly Gly Thr Thr Ile
 325 330 335
 Thr Gln His Gln Leu Glu Glu Leu Val Phe Ser Leu Pro Glu Ala His
 340 345 350
 Arg Val Met Phe Trp Arg Ala Lys Ala Glu Pro Ala Leu Leu Arg Val
 355 360 365
 Glu Ile Glu Val Ala Ala Ala His Arg Val Ala Ala Glu Ala Glu Leu
 370 375 380
 Thr Ala Ala Ile Arg Ala Ala Phe Gly Val Asp Ser Glu Val Thr Gly
 385 390 395 400
 Leu Ala Pro Gly Thr Leu Ile Pro Leu Asp Ala Leu Thr Ser Met Pro
 405 410 415
 Asp Val Val Lys Pro Arg Ser Leu Phe Gly Pro Asp Glu Asp Trp Ser
 420 425 430
 Lys Ala Leu Leu Tyr Tyr
 435

<210> 49

<211> 1317

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 49

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cggcgcctcc aggagaagca actggcggag acgttcacct gggcggccccg gtcgccgttc 120

taccggggcg ggctggcctc cggcgcgccg ccggtgacgc ccgccacct ggccgacctg 180

ccgctgacca ccaagcagga cctgcgggac aactaccctt tcggcatgct cgccgtgccc 240
 cgcgaaacggc tggcgacctt ccacgagtcg agcgggaccg ccgggaagcc caccctctcc 300
 tactacaccg cggaggactg gaccgacctg gcgagagcgt tcgcccgcaa gtggatcggc 360
 atgtccgccc acgacgtctt cctgggtccg acgccgtacg cgctgctgct gaccgggcat 420
 ctgccccacg ccgcagcccc gctgcggtgg gccacgggtg tacctggcga caaccggctg 480
 ctggcgatgc cgtacgcccc ggtgggtccg gtgatgcacg acctggacgt cacgctcacc 540
 tggtcggtgc cgacggagtg cctgatctgg gccgccgagg cgatcgcggc cgggcaccgg 600
 cccgacatcg acttccccg gctgcgcgcg ctgttcgtcg gcggcgagcc gatgaccgac 660
 gcccgccggc ggcggatcag ccgcctgtgg ggggtgccgg tcatcgagga gtacggctcg 720
 acggagaccg gcagcctggc cggggagtgcc cccgagggac gcctgcacct gtgggcccgc 780
 cgggcgctgt tcgaggtgta cgaccggac accggcgccg tccgcgcgga cggcgacggc 840
 cagctcgtgg tcacgccgt gttccgggag gcgatgccgc tgctgcggta caacctggag 900
 gacaacgtgt cggctctcta cgacgactgc ggatgcggct ggaagctgcc caccgtgcgg 960
 gtgctcggcc ggtcggcggt cggctaccgg gtcggcgcca ccaccatcac ccagcaccag 1020
 ctggaggaac tggctctctc cctgccggag gcgcaccggg tgatgttctg gcgggccaag 1080
 gcggagccgg cgctgttgcg ggtcgagatc gaggtggccg ccgcgcaccg ggtcgccgcc 1140
 gaggcggagc tgaccgccgc gatccggggc gccttcggcg tggacagcga ggtcaccggc 1200
 ctggcgccgg gaacctgat cccgctcgac gcgctgacca gcatgccgga cgtggtgaag 1260
 ccacgcagcc tgttcgggtc ggacgaggac tggagcaaag cgctcctcta ctactga 1317

<210> 50
 <211> 396
 <212> PRT
 <213> Micromonospora sp. strain 046-EC011

<400> 50

Met	Pro	Gln	Met	Arg	Val	Ala	Val	Ala	Gly	Ala	Gly	Ile	Ala	Gly	Leu
1				5					10					15	
Ala	Phe	Ala	Ala	Ala	Leu	Arg	Arg	Thr	Gly	Ile	Asp	Cys	His	Val	Tyr
			20					25					30		
Glu	Gln	Ala	Asp	Gln	Leu	Met	Glu	Val	Gly	Ala	Gly	Val	Gln	Val	Ala
		35					40					45			
Pro	Asn	Ala	Thr	Arg	Leu	Leu	His	Arg	Leu	Gly	Leu	Arg	Asp	Arg	Leu
	50					55					60				

Arg Thr Val Ala Val Ala Pro Gln Ala Ile Glu Met Arg Arg Trp Asp
 65 70 75 80
 Asp Gly Thr Leu Leu Gln Arg Thr Gln Leu Gly Ser Val Cys Gly Arg
 85 90 95
 Arg Phe Gly Ala Pro Tyr Tyr Val Val His Arg Ala Asp Leu His Ser
 100 105 110
 Ser Leu Leu Ser Leu Val Pro Pro Asp Arg Val His Leu Gly Ala Arg
 115 120 125
 Leu Thr Ala Val Thr Gln Thr Ala Asp Glu Ala Tyr Leu His Leu Ser
 130 135 140
 Asn Gly Thr Thr Val Ala Ala Asp Leu Val Val Gly Ala Asp Gly Ile
 145 150 155 160
 His Ser Val Ala Arg Glu Gln Ile Val Ala Asp Arg Pro Arg Phe Ser
 165 170 175
 Gly Gln Ser Ile Tyr Arg Gly Leu Val Pro Ala Glu Arg Val Pro Phe
 180 185 190
 Leu Leu Thr Glu Pro Arg Val Gln Leu Trp Phe Gly Pro Asp Gln His
 195 200 205
 Cys Val Cys Tyr Pro Val Ser Ala Gly Arg Gln Val Ser Phe Gly Ala
 210 215 220
 Thr Val Pro Ala Thr Asp Trp Arg Gln Glu Ser Trp Ser Gly Arg Gly
 225 230 235 240
 Asp Val Thr Gln Leu Ala Ala Ala Tyr Ala Gly Trp His Pro Asp Val
 245 250 255
 Thr Arg Leu Ile Ala Ala Ala Asp Arg Val Gly Arg Trp Ala Leu His
 260 265 270
 Asp Arg Asp Ser Ile Asp Arg Leu Ser Ala Gly Arg Val Thr Leu Ile
 275 280 285
 Gly Asp Ala Ala His Pro Met Leu Pro Phe Gln Ala Gln Gly Ala Asn
 290 295 300
 Gln Ala Val Glu Asp Ala Val Val Leu Ala Val Cys Leu Ala Gly Val
 305 310 315 320
 Glu Pro Ala Gly Leu Gly Ala Ala Leu Arg Arg Tyr Glu Arg Ile Arg
 325 330 335
 Leu Pro Arg Thr Thr Arg Ile Gln Arg Gln Ser Arg Ala Asn Ala Glu
 340 345 350
 Met Phe His Leu Ala Asp Gly Ala Asp Gln Arg Arg Arg Asp Val Ala
 355 360 365

Ala Gln Ser Ser Ser Gly Leu Asp Arg His Glu Trp Leu Phe Gly Tyr
 370 375 380

Asp Ala Glu Lys Ala Thr Thr Thr Ser Gly Ser Ala
 385 390 395

<210> 51

<211> 1191

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 51

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gtgggcgcgg gcgtgcaggt cgcgccgaac gccacccggc tgctgcaccg gctgggcctg      180
cgtgaccgcc tgcgtacggt ggctgtcgcg ccgcaggcga tcgagatgcg ccgctgggac      240
gacggcacgc tgctgcaacg caccagctg ggcagcgtgt gcggacgccg cttcggcgcg      300
ccgtactacg tgggtgcaccg cgcggaacctg cacagcagcc tgctgtcgtt ggtgccgccg      360
gaccgggtgc acctggggcg ccgcctcacc gccgtgacgc agaccgccga cgaggcgtag      420
ctgcacctgt ccaacggcac cacggtcgcg gcggatctcg tcgtggggcg cgacggcatc      480
cactcggtcg cgcgggagca gatcgtggcg gaccggccgc gcttctccgg acagtccatc      540
taccgcgggc tgggtgccggc cgagcgggtg ccgttctctg tcaccgaacc ccgggtgcag      600
ttgtggttcg ggccggacca gcaactgcgtc tgctaccggg tgcccgccgg ccggcaggtg      660
agcttcggcg cgacggtgcc cgccaccgac tggcggcagg agtcgtggtc gggccggggc      720
gacgtgacgc aactcgcggc cgcgtagcgc ggctggcacc cggacgtcac ccggctgac      780
gccgcggccg accgggtcgg caggtggggc ctgcacgacc gggacagcat cgaccggctc      840
agcgcgggac ggggtgacct gatcggcgac gccgcgcacc cgatgctgcc gttccaggcg      900
cagggcgcgga accaggccgt cgaggacgcg gtgggtgctc cggctctgct ggccggcggtg      960
gaaccggcgg gcctggggcg cgcgctgcgc cgctacgaac ggatccgcct gcccgggacc     1020
accgggatcc agcggcagtc ccgggccaac gccgagatgt tccacctggc cgacggcgcc     1080
gaccagcgcc gccgggacgt cgccgcacaa tcctcgctcc gcctggaccg ccacgaatgg     1140
ctcttcgggt acgacgccga gaaagccacc acgaccagcg ggagcgctg a              1191

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<210> 52

<211> 261

<212> PRT

<213> Micromonospora sp. strain 046-ECO11

<400> 52

Met Glu Leu Thr Gly Ile Glu Ser Lys Val Ala Leu Val Thr Gly Ala
1 5 10 15
Gly Gln Gly Ile Gly Ala Ala Val Ala Gly Val Leu Ala Arg Ala Gly
20 25 30
Ala Gln Val Ala Ala Val Asp Arg Asn Ala Glu Ala Leu Thr Thr Val
35 40 45
Val Thr Lys Leu Ala Ala Glu Gly Asp Ser Ala Arg Ala Tyr Cys Val
50 55 60
Asp Val Cys Asp Ser Glu Ala Val Asp Ala Leu Val Arg Arg Val Glu
65 70 75 80
Asp Glu Met Gly Pro Val Ala Ile Leu Val Asn Ala Ala Gly Val Leu
85 90 95
His Thr Gly Arg Val Val Glu Leu Ser Asp Arg Gln Trp Arg Arg Thr
100 105 110
Phe Ser Val Asn Ala Asp Gly Val Phe His Val Ser Arg Ala Val Ala
115 120 125
Arg Arg Met Val Gly Arg Arg Arg Gly Ala Ile Val Thr Val Ala Ser
130 135 140
Asn Ala Ala Gly Val Pro Arg Thr Glu Met Ala Ala Tyr Ala Ala Ser
145 150 155 160
Lys Ala Ala Ser Ala Gln Phe Thr Arg Cys Leu Gly Leu Glu Leu Ser
165 170 175
Gly Tyr Gly Ile Arg Cys Asn Val Val Ser Pro Gly Ser Thr Asp Thr
180 185 190
Pro Met Leu Arg Ala Met Leu Gly Glu Gly Ala Asp Pro Ser Ala Val
195 200 205
Ile Glu Gly Thr Pro Gly Ala Tyr Arg Val Gly Ile Pro Leu Arg Lys
210 215 220
Leu Ala Gln Pro Arg Asp Val Ala Glu Ala Val Ala Tyr Leu Val Ser
225 230 235 240
Asp Gln Ala Gly His Val Thr Met His Asp Leu Tyr Val Asp Gly Gly
245 250 255
Ala Ala Leu His Val
260

<210> 53

<211> 786

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 53

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atggaactga ccggaatcga gtcgaaggtc gccctggtca cgggcgcggg gcagggcatc      60
ggcgccgccc tggccggtgt cctggcgagg gcgggcgcgc aggtggcggc ggtggaccgc      120
aacgccgagg cgctgaccac cgctcgtgac aagctcgccg ccgagggcgga ctccggcgcg      180
gcctactgcg tcgacgtgtg cgacagcgag gcggtggacg cgctggtgcg ccgggtcgag      240
gacgagatgg ggccggtcgc catcctggtc aacgccgccc gcggtgctga caccggacgg      300
gtcgtcgagc tgtcggaccg gcagtggcgc cggaccttct cggatgaacgc cgacggcggtg      360
ttccacgtgt cccgggcggt ggcgcgggcg atggtgggccc gccgtcgtgg cgcgatcgtc      420
accgtggcgt cgaacgccgc cggggtgccg cgtaccgaga tggccgcgta cgccgcctcc      480
aaggccgcgt ccgcgcagtt caccgcgtgc ctggggcttg agctgtccgg ctacggcatc      540
cggtgcaacg tggctctgcc cggtccacc gacaccccca tgctgcgggc catgctcggc      600
gagggcgccg acccgagcgc ggtgatcgag ggcacgccgg gcgcgtaccg cgtcggcatc      660
ccgctgcgca agctggccca gccgcgcgac gtggccgagg cggtcgccta tctggtgtcc      720
gaccaggcgg gccacgtgac catgcacgac ctgtacgtcg acggcgggcg gccctgcac      780
gtgtga                                           786
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<210> 54

<211> 224

<212> PRT

<213> Micromonospora sp. strain 046-EC011

<400> 54

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Met Ala Met Thr Pro Ile Ala Pro Tyr Arg Met Pro Gly Asp Gly Asp
1           5           10          15
Leu Pro Gly Thr Ala Leu Pro Trp Arg Pro His Pro Asp Arg Ala Ala
          20           25           30
Val Leu Val His Asp Leu Gln Arg Tyr Phe Leu Arg Pro Phe Glu Ala
          35           40           45
Gly Glu Ser Pro Met Ala Glu Leu Leu Pro Asn Val Ala Lys Leu Leu
          50           55           60
Ala Thr Ala Arg Ala Ala Gly Val Pro Val Leu Tyr Thr Ala Gln Pro
65           70           75           80
Gly Gly Met Ser Arg Gln Asp Arg Gly Leu Leu His Asp Leu Trp Gly
          85           90           95
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Pro Gly Met Ser Ser Ala Glu Asp Asp Arg Gly Ile Val Asp Asp Val
100 105 110

Ala Pro Gln Pro Gly Asp Thr Val Leu Thr Lys Trp Arg Tyr Ser Ala
115 120 125

Phe Phe Arg Ser Asp Leu Glu Glu Arg Leu Arg Gly Ala Gly Arg Asp
130 135 140

Gln Leu Val Val Cys Gly Val Tyr Ala His Met Gly Cys Leu Ile Thr
145 150 155 160

Ala Cys Asp Ala Phe Ser Arg Asp Ile Glu Ala Phe Leu Val Ala Asp
165 170 175

Ala Leu Ala Asp Leu Ser Arg Glu Asp His Leu Met Ala Leu Arg Tyr
180 185 190

Ala Ala Asp Arg Cys Ala Val Pro Leu Trp Thr Ala Asp Val Leu Asp
195 200 205

Gly Leu Ala Asp Ala Ala Gly Arg Pro Asp Gln Ser Ser Thr Gln Arg
210 215 220

<210> 55
<211> 675
<212> DNA
<213> Micromonospora sp. strain 046-EC011

<400> 55
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gcgctgcctt ggcgtccgca cccggaccgg gccgccgtgc tgggtgcacga cctgcaacgc 120
tacttctctgc gcccgttcga ggccggggag tccccgatgg ccgaactgct ccccaacgtc 180
gcgaagctgc tcgccacggc gcggggcgcc gccgtgccgg tgctgtacac cgcgcagccc 240
ggcggcatga gccggcagga ccgcggggtg ctgcacgacc tgtggggccc cggcatgagc 300
agcgccgagg acgaccggg catcgtcgac gacgtcgccc cgcagccggg cgacacggtg 360
ctgaccaagt ggcgctacag cgcgttcttc cgcagcgacc tggaggagcg actgcgcggt 420
gcgggacggg accagctcgt ggtctgcggc gtgtacgcgc acatggggtg cctgatcacc 480
gcctgcgacg cgttcagccg cgacatcgag gcgttctctg tggcggacgc gctggccgac 540
ctatcgcgcg aggaccacct gatggcgctg cgctacgcgc cggaccgctg cgcggtgccg 600
ttgtggacgg cggatgtgct ggacgggctg gcggacgcgc ccgggcgtcc ggatcagagc 660
agcacccaac gatga 675

<210> 56

<211> 233
 <212> PRT
 <213> Micromonospora sp. strain 046-EC011

<400> 56

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Met Ser Asp Arg Thr Arg Val Val Val Val Gly Gly Thr Ser Gly Ile
1          5          10          15

Gly Arg His Phe Ala Arg Phe Cys Ala Glu Arg Gly Asp Asp Val Val
          20          25          30

Ile Thr Gly Arg Ser Ala Ala Arg Thr Lys Thr Val Ala Asp Glu Ile
          35          40          45

Gly Gly Arg Thr Arg Gly Leu Ala Leu Asp Leu Ala Glu Pro Glu Thr
          50          55          60

Ile Ala Asp Ala Leu Ala Asp Val Pro His Val Asp Arg Leu Val Val
65          70          75          80

Ala Ala Leu Asp Arg Asp Tyr Asn Thr Val Arg Ala Tyr Arg Pro Gly
          85          90          95

Asp Ala Ala Arg Leu Leu Thr Val Lys Leu Val Gly Tyr Thr Ala Val
          100          105          110

Leu His Ala Leu Ala Pro Arg Met Thr Asp Glu Ser Ala Val Val Leu
          115          120          125

Leu Gly Gly Leu Ala Ser His Arg Pro Tyr Pro Gly Ser Thr Ser Val
          130          135          140

Thr Thr Ala Asn Gly Gly Ile Ser Ala Leu Val Arg Thr Leu Ala Val
          145          150          155          160

Glu Leu Ser Pro Val Arg Val Asn Ala Leu His Pro Ser Ile Val Ser
          165          170          175

Asp Thr Pro Phe Trp Ser Asp Lys Pro Ala Ala Arg Glu Ala Ala Ala
          180          185          190

Thr Arg Ala Leu Ser Arg Arg Pro Val Thr Met Gln Asp Cys Ala Glu
          195          200          205

Ala Ile Asp Phe Leu Leu Thr Asn Arg Ser Ile Asn Gly Val Asn Leu
          210          215          220

Asn Ile Asp Gly Gly Asp Val Leu Ile
225          230

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<210> 57
 <211> 702
 <212> DNA
 <213> Micromonospora sp. strain 046-EC011

<400> 57

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 gcccgattct gcgccgaacg cggagacgac gtggtgatca ccggccgttc ggcggcccg 120
 accaagaccg tggcggacga gatcggcggg cggacccgtg ggctcgtctc cgacctggcc 180
 gagccggaga cgatcgcgga cgcgctcgcc gacgtgccgc acgtcgaccg gctcgtggtc 240
 gcggcgctgg accgcgacta caacaccgtc cgcgcgtacc ggccggggcga cgcggcgcg 300
 ctgctgaccg tcaagctggg cggctacacg gcggtcctgc acgccctcgc cccgcggatg 360
 accgacgaga gcgcagtcgt gctgctcggc ggcctggcca gccaccggcc gtatcccggc 420
 tccacctccg tcacgaccgc caacggcggg atcagcgcgc tgggtcggac cctggctgtg 480
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 tggagcgaca agcccgccgc gcgggaggcc gccgcgacc gcgcgctcag ccgacggccg 600
 gtcaccatgc aggactgcgc cgaggcgatc gacttcctgc tgacgaaccg ctcgataaac 660
 ggggtcaacc tgaacatcga cggcgggggac gtgctcatct ga 702

<210> 58
 <211> 246
 <212> PRT
 <213> Micromonospora sp. strain 046-EC011
 <400> 58

Met	Thr	Ser	Ala	Leu	Arg	Thr	Ser	Ala	Trp	Thr	Tyr	Asp	Asp	Phe	Thr
1				5					10					15	
Ser	Arg	Glu	Leu	Asp	Pro	Ala	Arg	Trp	Ala	Ile	Met	Ser	Ile	Ala	Gly
			20					25					30		
Ala	Asp	Gly	Gln	Thr	His	Arg	Tyr	Gln	Asp	Arg	Asn	Ala	Gln	Val	Arg
			35					40					45		
Thr	Gly	Asp	Gly	Arg	Leu	Glu	Leu	Thr	Val	Asp	Pro	Phe	Thr	Arg	Phe
		50				55					60				
His	Asp	Thr	Asp	Pro	Arg	Gln	Asn	Asn	Ala	Lys	Gln	Met	Tyr	Arg	Ser
65					70					75					80
Val	Arg	Arg	Phe	Ala	Val	Pro	Ala	Glu	Gly	Ser	Leu	Thr	Val	Glu	Val
			85						90					95	
Glu	Met	Gly	Val	Arg	Thr	Tyr	Arg	Gln	Ile	Pro	His	Asp	Leu	Leu	Asp
			100					105					110		
Ala	Phe	Gly	Thr	Val	Asn	Leu	Phe	Asp	Leu	Glu	Thr	Gly	Val	Val	Phe
			115				120					125			
Asn	Ala	Ala	Ala	Thr	Asn	Asp	Thr	Val	Tyr	Ala	Thr	Val	Glu	Arg	Leu

130	135	140
Val Leu Pro Gly Val Thr Gln Pro His Glu His Tyr Ile His Arg Val		
145	150	155 160
Val Leu Asp Val Pro Thr Glu Pro Gly Arg Ala His Gly Tyr Ala Ile		
	165	170 175
Thr Tyr Arg Ala Pro Thr Ser Glu Val Glu Phe His Val Asp Gly Arg		
	180	185 190
Leu Ala Tyr Trp Ala Arg Val Pro Val Pro Val Thr Gly Phe His Ala		
	195	200 205
Gly Met Ala Leu Phe Ser Ala Arg Asp Leu Ala Arg Tyr Pro Arg Glu		
	210	215 220
Gln Arg Glu His Gly Gln Gly Ala Thr Gly Trp Trp Gly Pro Trp Arg		
225	230	235 240
Ile Ala Ser Gly Val Arg		
	245	

<210> 59
 <211> 741
 <212> DNA
 <213> Micromonospora sp. strain 046-EC011

<400> 59
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 gaccccgccc gctgggcgat catgtcgcgc gccggcgcg acgggcagac ccacaggtac 120
 caggaccgca acgcccaggt ccgcaccggc gacgggcggc tggagctgac cgtcgacccg 180
 ttcacccgct tccacgacac cgatccccgg cagaacaacg ccaagcagat gtaccggctg 240
 gtgcggcgct tcgccgtgcc ggcgaggggc tcgctgaccg tcgaggtgga gatgggctg 300
 cggacgtacc ggcagatccc gcacgacctg ctggacgcgt tcggcacggt gaacctgttc 360
 gacctggaga ccggcgctcgt gttcaacgcc gccgccacga acgacaccgt gtacgcgacg 420
 gtcgagcgcc tgggtgctgcc cggcgctgacc cagccgcacg agcactacat ccaccgggtg 480
 gtcctggacg tgccgacgga gccggggccgg gcgcacggat acgccatcac ctaccggggc 540
 ccgacgtcgg aggtggagtt ccacgtcgac ggccggctcg cctactgggc gcgggtcccc 600
 gtgccggtga ccggattcca cgccggcatg gcgctcttct ccgcccgcga cctggcccgg 660
 taccgccgag agcagcggga gcacgggcag ggcgcgaccg ggtggtgggg gccgtggcgg 720
 atcgctccg gcgtcagatg a 741

<210> 60

<211> 111
 <212> PRT
 <213> Micromonospora sp. strain 046-EC011

<400> 60

Met	Asp	Thr	Ala	Ala	Pro	Ala	Thr	Asp	Gly	Gly	Arg	Tyr	Leu	Ala	Val
1				5					10					15	
His	His	Ser	Ala	Glu	Phe	Arg	Glu	Leu	Arg	Arg	Arg	Ser	Ser	Thr	Phe
			20					25					30		
Thr	Leu	Trp	Ala	Ser	Val	Ala	Phe	Phe	Gly	Trp	Trp	Phe	Leu	Gly	Ser
		35					40					45			
Leu	Leu	Ala	Thr	Tyr	Ala	Pro	Asp	Phe	Phe	Arg	Glu	Lys	Val	Ala	Gly
	50					55					60				
Pro	Val	Asn	Val	Gly	Leu	Leu	Phe	Val	Phe	Leu	Ser	Phe	Ala	Phe	Val
65					70					75					80
Val	Thr	Leu	Ala	Ala	Phe	Tyr	Leu	Arg	Tyr	Ala	Arg	Thr	His	Leu	Asp
				85					90					95	
Pro	Leu	Ser	Glu	Lys	Ile	Arg	Ala	Asp	Leu	Glu	Gly	Ala	Ser	Arg	
			100					105					110		

<210> 61
 <211> 336
 <212> DNA
 <213> Micromonospora sp. strain 046-EC011

<400> 61

atggacacgg	cagctccggc	aacggacggc	ggtcgtacc	tcgccgtcca	tcacagcgca	60
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ttcggctggt	ggttcctcgg	cagcctgctc	gccacctacg	cgccggactt	cttcggggag	180
aaggtggccg	gcccgggtcaa	cgtgggtctg	ctcttcgtct	tcctgtcggt	cgccttcgtg	240
gtgacgctcg	ccgccttcta	cctgcgttac	gcccgcacgc	atctcgatcc	gctcagcgag	300
aagatccgtg	ccgacctgga	aggagcgtcc	cgatga			336

<210> 62
 <211> 559
 <212> PRT
 <213> Micromonospora sp. strain 046-EC011

<400> 62

Met	Ser	Val	Ile	Leu	Ala	Asp	Pro	Pro	Pro	Pro	Val	Asp	Asn	Thr	Trp
1				5					10					15	
Ala	Thr	Pro	Ala	Ile	Ala	Val	Pro	Val	Thr	Ile	Val	Leu	Ala	Leu	Ala

20					25					30					
Val	Leu	Tyr	Leu	Val	Arg	Ser	Ala	Arg	Ala	Ser	Thr	Thr	Thr	Ala	Asp
	35						40					45			
Gly	Phe	Leu	Leu	Ala	Asp	Arg	Arg	Ile	Gly	Pro	Val	Gln	Asn	Ala	Leu
	50					55					60				
Ala	Val	Ala	Ser	Ala	Pro	Leu	Met	Tyr	Ser	Thr	Met	Tyr	Ile	Ile	Thr
65						70					75				80
Gly	His	Ile	Ala	Leu	Ser	Gly	Tyr	Asp	Ala	Ile	Leu	Leu	Met	Thr	Ala
				85					90					95	
Phe	Thr	Met	Gly	Thr	Met	Leu	Ala	Leu	Phe	Leu	Phe	Ala	Gly	Pro	Val
			100					105					110		
Arg	Asn	Val	Gly	Gly	Tyr	Thr	Leu	Gly	Asp	Leu	Leu	Ala	Val	Arg	Thr
		115					120					125			
Arg	Glu	Arg	Pro	Ala	Arg	Ile	Ala	Ser	Ala	Val	Leu	Thr	Leu	Leu	Thr
	130					135					140				
Tyr	Val	Met	Leu	Thr	Val	Ile	Met	Met	Ala	Ala	Ile	Ala	Phe	Ile	Phe
145						150					155				160
Asn	Arg	Trp	Phe	Gly	Val	Asp	Ala	Leu	Val	Gly	Leu	Val	Leu	Pro	Val
				165					170					175	
Phe	Val	Val	Gly	Leu	Ile	Thr	Val	Gly	Tyr	Val	Tyr	Leu	Gly	Gly	Met
			180					185					190		
Leu	Gly	Val	Thr	Arg	Ile	Leu	Val	Phe	Lys	Leu	Val	Leu	Ser	Val	Val
		195					200					205			
Val	Val	Gly	Val	Leu	Thr	Ala	Trp	Val	Leu	Ala	Arg	Phe	Asp	Leu	Asn
	210					215					220				
Leu	Phe	Ser	Leu	Leu	Glu	Arg	Ala	Glu	Ala	Asn	Ala	Ala	Pro	Val	Pro
225						230					235				240
Ser	Gly	Ser	Asp	Leu	Leu	Gly	Pro	Gly	Arg	Leu	Phe	Gly	Glu	Gly	Ala
				245					250					255	
Thr	Thr	Leu	Val	His	Leu	Ser	Lys	Leu	Phe	Ala	Ile	Ala	Val	Gly	Val
			260					265					270		
Ala	Ala	Ile	Pro	Phe	Leu	Phe	Met	Arg	Asn	Phe	Ala	Val	Thr	Ser	Gly
		275					280					285			
Arg	Asp	Ala	Arg	Arg	Ser	Thr	Gly	Trp	Ala	Ser	Met	Ile	Ile	Val	Gly
	290					295					300				
Phe	Tyr	Leu	Cys	Leu	Ser	Val	Val	Gly	Leu	Gly	Ala	Val	Ala	Ile	Leu
305						310					315				320
Gly	Arg	Asp	Asn	Ile	Gly	Val	Ile	Lys	Ala	His	Arg	Asp	Ile	Ser	Phe

325	330	335
Pro Lys Leu Ala Asp Glu Leu Gly Gly Pro Val Met Val Gly Ser Leu		
340	345	350
Ala Gly Val Ala Val Leu Thr Ile Val Gly Val Phe Ala Pro Leu Leu		
355	360	365
His Ser Ala Val Thr Thr Val Thr Lys Asp Leu Asn Val Ile Arg Gly		
370	375	380
Arg Arg Leu Asp Pro Ala Ala Glu Leu Arg Asp Ile Lys Arg Asn Thr		
385	390	395
Leu Ile Ile Gly Val Gly Ser Val Leu Leu Ala Val Val Met Leu Pro		
405	410	415
Val Arg Thr His Ile Phe Ile Pro Thr Ser Ile Asp Ile Ala Gly Ala		
420	425	430
Val Val Leu Pro Ile Val Val Tyr Ala Leu Phe Trp Arg Arg Phe Asn		
435	440	445
Thr Arg Gly Leu Gln Trp Thr Val Tyr Gly Gly Leu Ala Leu Thr Ala		
450	455	460
Phe Leu Val Leu Phe Ser Asn Gly Val Ser Gly Glu Pro Asp Ala Ile		
465	470	475
Phe Pro Asp Arg Asn Phe Lys Phe Val Asp Val Glu Pro Ala Leu Ile		
485	490	495
Thr Val Pro Val Gly Phe Leu Leu Gly Tyr Leu Gly Ser Ile Thr Ser		
500	505	510
Arg Glu Arg Asp Asp Ala Ala Phe Ala Glu Met Gln Val Arg Ser Leu		
515	520	525
Thr Gly Ala Val Val Thr Gly Pro Pro Arg Pro Ala Ala Val Asp Asp		
530	535	540
Glu Asp Arg Asp Gly Arg Gln Asp Arg Ala Pro Ser Pro Val Ser		
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<210> 63

<211> 1680

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 63

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cgcgccagca ccaccaccgc ggacggcttc ctgctggccg accggcggat cgggccggtg 180

cagaacgcgc tggcggtggc ctccgcgccg ctgatgtact cgacgatgta catcatcacc 240

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<210> 64
 <211> 5960
 <212> DNA
 <213> Micromonospora sp. strain 046-EC011

<400> 64	
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<210> 65
<211> 532
<212> PRT
<213> Micromonospora sp. strain 046-EC011

<400> 65

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Val Thr Ala Leu Ala Leu Ala Arg His Gly Val Ala Cys Val Leu Val
20 25 30

Asp Gln Gly Phe Glu Thr Ser Val His Pro Lys Leu Asp Tyr Val Asn
35 40 45

Ala Arg Ser Met Glu Phe Leu Arg Gln Phe Gly Leu Ala Asp Asp Val
50 55 60

Arg Ala Ala Gly Val Ala Pro Glu His Arg Ala Asp Val Ile Trp Ser
65 70 75 80

Thr Gly Leu Ala Gly Glu Pro Ile Thr Arg Trp Gly Leu Pro Ser Val
85 90 95

Thr Gln Glu Trp Arg Arg Ile Ala Glu His Asn Asp Gly Thr Gln Pro
100 105 110

Ala Glu Pro Gly Gln Arg Ile Ser Gln Ile Asp Leu Glu Pro Val Leu
 115 120 125
 Arg Ala Arg Cys Arg Arg Glu Pro Leu Val Asp Leu Arg Leu Gly Val
 130 135 140
 Arg Phe Asp Ser Leu Thr Gln Asp Asp Ala Gly Val Thr Ser Val Leu
 145 150 155 160
 Ala Asp Asp Thr Gly Gly Glu Val Arg Val Arg Ser Glu Tyr Val Val
 165 170 175
 Gly Cys Asp Gly Ala Ser Ser Gln Val Arg Arg Ala Val Gly Ile Gly
 180 185 190
 Glu Glu Gly Phe Asp Val Pro Gly Leu Pro Gly Ala Phe Met Val His
 195 200 205
 Phe Thr Ser Arg Asp Leu Asp Ser Leu His Arg His Gly Arg Phe Trp
 210 215 220
 His Tyr Phe Ala Phe Arg Tyr Val Ile Ile Ala Gln Asp Glu Val Asp
 225 230 235 240
 Thr Trp Thr Ala His Val Asn Gly Val Asp Pro Asn Glu Phe Asp Glu
 245 250 255
 Pro Pro Ala Asp Pro Glu Ala Phe Leu Leu Asp Thr Ile Arg Thr Glu
 260 265 270
 Leu Arg Ile Asp Lys Val Leu Leu Thr Ser Arg Trp Arg Pro Gly Phe
 275 280 285
 Met Leu Ala Asp Arg Tyr Arg Ala Gly Arg Val Leu Leu Ala Gly Asp
 290 295 300
 Ser Ala His Arg Met Phe Pro Thr Gly Ala Tyr Gly Met Asn Thr Gly
 305 310 315 320
 Ile Gly Asp Ala Val Asp Val Ala Trp Lys Leu Ala Ala Val Val Arg
 325 330 335
 Gly Phe Gly Gly Pro Gly Leu Leu Asp Ser Tyr Asp Ala Glu Arg Arg
 340 345 350
 Pro Val Gly Arg Arg Asn Met Arg Thr Ser His Arg His Leu Gly Val
 355 360 365
 His Leu Arg Ala Gly Glu Leu Leu Arg Gly Gly Ala Pro Leu Pro Ser
 370 375 380
 Val Ala Ala Phe Leu Asp Ala Glu Arg Gly Glu Asn Glu Tyr Arg Gly
 385 390 395 400
 Ile Glu Leu Gly Tyr Arg Tyr Ser Gly Ser Pro Val Leu Trp Pro Glu
 405 410 415

Gly Pro Gly Glu Pro Ser Asp Asp Pro Arg Ala Tyr Ala Pro Thr Thr
 420 425 430
 Trp Pro Gly Ala Arg Pro Pro Ser Leu Leu Leu Ser Asp Gly Gln Gln
 435 440 445
 Ile Phe Asp Arg Phe Asp Pro Ala Ser Phe Thr Leu Val Asp Phe Thr
 450 455 460
 Gly Asp Gly Ala Ala Gly Pro Leu Leu Ala Ala Ala Ala Arg Gly
 465 470 475 480
 Leu Pro Val Thr His Thr Val Val Thr Asp Pro Arg Ala Arg Glu Leu
 485 490 495
 Trp Glu Arg Asp Leu Val Leu Leu Arg Pro Asp His His Val Ala Trp
 500 505 510
 Arg Gly Asn Thr Val Pro Pro Asp Pro Asp Ala Val Val Gln Arg Val
 515 520 525
 Arg Gly Gly Gly
 530

<210> 66
 <211> 1599
 <212> DNA
 <213> Micromonospora sp. strain 046-EC011

<400> 66
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<210> 67
 <211> 423
 <212> PRT
 <213> Micromonospora sp. strain 046-EC011

<400> 67

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 35 40 45
 Pro Gly Glu Val Arg Gly Phe Arg Gln Leu Leu Ser Glu Leu Ala Ser
 50 55 60
 Thr Asp Gly Leu Leu Leu Gln Leu Gly Asp Cys Ala Glu Ser Leu Tyr
 65 70 75 80
 Glu Cys Thr Pro Arg His Thr Ser Asp Lys Ile Glu Val Ile Asp Arg
 85 90 95
 Leu Gly Asp Arg Leu Ser Glu Leu Thr Gly Arg Asn Val Leu Arg Val
 100 105 110
 Gly Arg Met Ala Gly Gln Phe Ala Lys Pro Arg Ser Gln Ala Thr Glu

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Trp	Trp	Ala	Tyr	Glu	Ala	Ser	Asp	Arg	Val	Gln	Arg	Val	Leu	Arg	Ala	
165					170					175						
His	Arg	Glu	Gly	Asn	Arg	Arg	Ala	Ala	Arg	Thr	Glu	Gly	Pro	Trp	Ser	
180					185					190						
Ser	His	Glu	Ala	Leu	Val	Val	Asp	Tyr	Glu	Ser	Arg	Leu	Ile	Arg	Arg	
195					200					205						
Asp	Pro	Asp	Thr	Gly	Glu	His	Tyr	Leu	Ala	Ser	Thr	His	Leu	Pro	Trp	
210					215					220						
Val	Gly	Glu	Arg	Thr	Arg	Arg	Ser	Ala	Glu	Ala	His	Val	Ala	Met	Leu	
225					230					235					240	
Ser	Thr	Val	Val	Asn	Pro	Val	Gly	Cys	Lys	Ile	Gly	Pro	Asp	Ala	Asp	
245					250					255						
Pro	Asp	Asp	Val	Leu	Arg	Val	Cys	Glu	Ala	Leu	Asp	Pro	Arg	Arg	Asp	
260					265					270						
Pro	Gly	Arg	Leu	Val	Leu	Ile	Pro	Arg	Met	Gly	Arg	Asp	Arg	Ile	Arg	
275					280					285						
Glu	Ser	Leu	Pro	Pro	Ile	Val	Arg	Ala	Val	Val	Asn	Ala	Gly	His	Pro	
290					295					300						
Val	Leu	Trp	Leu	Ser	Asp	Pro	Met	His	Gly	Asn	Thr	Val	Lys	Ala	Ser	
305					310					315					320	
Val	Gly	Leu	Lys	Thr	Arg	His	Leu	Ser	Asp	Val	Val	Thr	Glu	Ala	Leu	
325					330					335						
Trp	Phe	Arg	Asp	Ile	Leu	Asp	Gln	Gln	Arg	Gln	His	Ala	Ala	Gly	Leu	
340					345					350						
His	Ile	Glu	Val	Ala	Ala	Thr	Asp	Val	Thr	Glu	Cys	Val	Gly	Gly	Ser	
355					360					365						
Val	Ala	Gly	Glu	Glu	Asp	Leu	Ala	Arg	His	Tyr	Thr	Ser	Leu	Cys	Asp	
370					375					380						
Pro	Arg	Leu	Asn	Pro	Gly	Gln	Ala	Thr	Glu	Leu	Ile	Glu	Ala	Trp	Ala	
385					390					395					400	
Lys	Asp	Thr	Ala	Thr	Val	Gly	Pro	Gly	Pro	Arg	Arg	Ser	Gly	Pro	Ser	
405					410					415						
Ala Arg Pro Glu Val Ala Ala																

420

<210> 68
 <211> 1272
 <212> DNA
 <213> Micromonospora sp. strain 046-EC011

<400> 68
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 gcgggtccagc aaccggactg gcaggaccac ccggcgtagc cggagacctg tcaggcggtg 120
 gcgtcggccc cgccgctggt cccacccggg gaggtacggg ggttccggca gctgttgctg 180
 gagctggcgt cgaccgacgg gctcctgctg cagttgggcg actgcgccga gagcctctac 240
 gagtgcaccc cccggcacac ctccgacaag atcgaggtca tcgaccggct gggggaccgg 300
 ctacgcgagc tcaccgggcg caacgtgctg cgggtgggccc ggatggccgg gcagttcgcc 360
 aagccccggt cgcaggcgac ggagtggcac gacgcgctga gcatccctc cttccgcggc 420
 cacatgatca attccgagct ggccgcgccc ggtacgcgca aggccgaccc tcgccgcatg 480
 tgggtgggctg acgaggcgag cgaccgggtg cagcgggtcc tgcgcgcca ccgggagggc 540
 aaccggcggtg ccgcgcggac cgagggggccg tggtcgagcc acgaggccct ggtcgtcgac 600
 tacgagtcct gcctgatccg ccgggacccg gacacgggcg agcactacct ggcgtcgacc 660
 cacctgccgt ggggtggggga gcggacccgc cgggtccgccc aggcgcacgt ggccatgctg 720
 tccacggtgg tgaaccgggt cggctgcaag atcgggcccg acgccgaccc ggacgacgtc 780
 ctgcgggtgt gcgaggcgct cgaccgcgcg cgcgatccgg gccgtctcgt cctgatcccg 840
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 gcggggcacc ccgtgctctg gctgagcgat cccatgcacg gcaacaccgt caaggcctcg 960
 gtcggcctga agacgcgcca cctctccgac gtggtcaccg aggcgctgtg gttccgcgac 1020
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 gtgaccgagt gcgtcggcgg ttcggtgccc ggcgaggagg acctggcgcg gcactacacc 1140
 tcgctgtgcg acccgcggtc caaccgggtc caggccaccg agctgatcga agcgtggggc 1200
 aaggacaccg cgacggtcgg cccgggaccg cggcgctccg gcccttcggc gcggccggag 1260
 gtcgccgcct ga 1272

<210> 69
 <211> 340
 <212> PRT
 <213> Micromonospora sp. strain 046-EC011

<400> 69

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Phe	Pro	Leu	Pro	Asp	Ala	Ala	Thr	Glu	Asp	Arg	Ser	Val	Leu	Gly	Glu	20	25	30	
Thr	Val	Pro	Val	Ser	Ala	Leu	Leu	Pro	Gly	Asp	Ser	Pro	Arg	Leu	Ala	35	40	45	
Gly	Glu	Asn	Val	Glu	His	Ile	Arg	Leu	Leu	Ala	Ala	Met	His	Asp	Leu	50	55	60	
Pro	Pro	Ile	Leu	Val	Gln	Arg	Gly	Thr	Met	Arg	Val	Ile	Asp	Gly	Met	65	70	75	80
His	Arg	Leu	Arg	Ala	Ala	Lys	Leu	Arg	Gly	Asp	Glu	Thr	Val	Arg	Val	85	90	95	
Thr	Phe	Phe	Asp	Gly	Asp	Asp	Ala	Ala	Ala	Phe	Leu	Leu	Ser	Val	Asp	100	105	110	
Ala	Asn	Ile	Lys	His	Gly	Leu	Pro	Leu	Ser	Arg	Ala	Asp	Arg	Glu	Ala	115	120	125	
Ala	Ala	Thr	Arg	Ile	Leu	Arg	Leu	Tyr	Pro	Gln	Trp	Ser	Asp	Arg	Ala	130	135	140	
Val	Ala	Ala	Ala	Ala	Gly	Leu	Ser	Pro	Thr	Thr	Ala	Ser	Gly	Ile	Arg	145	150	155	160
Arg	Arg	Leu	Leu	Gln	Pro	Ala	Ala	Arg	Glu	Gly	Ser	Arg	Val	Gly	Arg	165	170	175	
Asp	Gly	Arg	Val	Arg	Pro	Leu	Asp	Gly	Ser	Ala	Gly	Arg	Arg	Arg	Ala	180	185	190	
Ser	Ala	Val	Ile	Ala	Leu	Arg	Pro	Asp	Ala	Pro	Leu	Arg	Ala	Ile	Ala	195	200	205	
Gln	Glu	Ala	Gly	Val	Ser	Val	Gly	Thr	Ala	Arg	Asp	Val	Arg	Ala	Arg	210	215	220	
Leu	Gln	Ala	Gly	Arg	Asp	Pro	Val	Leu	Thr	Ser	Gln	Arg	Pro	Ala	Ala	225	230	235	240
Glu	Pro	Glu	Pro	Ala	Ala	Asp	Asp	Gly	Pro	Glu	Ala	Arg	Arg	Arg	Arg	245	250	255	
Leu	Gly	Gln	Pro	Ser	Val	Pro	Pro	Val	Asp	Trp	Pro	Ala	Val	Arg	Gly	260	265	270	
Asn	Leu	Ile	Arg	Asp	Pro	Ala	Val	Lys	Tyr	Ala	Glu	Leu	Gly	Arg	Ala	275	280	285	

Phe Val Arg Trp Ala Asp Gly His Val Val Asp Pro Ala Ala Trp Arg
 290 295 300
 Glu Phe Val Asp Ala Val Pro Pro Tyr Trp Arg Lys Ser Val Ala Glu
 305 310 315 320
 Leu Ala Arg Ser Cys Ala Ser Ala Trp Leu Ala Phe Ala Gln Glu Leu
 325 330 335
 Glu Asp Arg Ala
 340

<210> 70
 <211> 1023
 <212> DNA
 <213> Micromonospora sp. strain 046-EC011

<400> 70
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 cccggtgact ccccgcggtt ggcgggagac aacgtcgagc acatccggct gctggccgag 180
 atgcacgacc tcccgcgat cctggtgcaa cgcggcacga tgcgggtgat cgacggcatg 240
 caccggctgc gggccgcaa gctgcgcggc gacgagaccg tgcgggtgac gttcttcgac 300
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 cgccgcctgc tgcaaccggc ggcgcgggag ggcagccggg tgggacggga cgggcggtg 540
 cgcccgtg acggctcggc gggccgacgg cgggacgagc cggatcatgc gctccggccc 600
 gacgcgcccc tgcgtgccat cgcgcaggag gccgggggtg cgggtgggac ggcgcgggac 660
 gtgcgcgccc gggtgcaggc gggccgggac cccgtcctga cctcgcagcg accggcgggc 720
 gagcccgagc cggccgcccga cgacggggccg gaggcgcgca gacgccggct cggccagccc 780
 tccgtgccgc ctgtcgactg gccggcggtg cggggcaacc tgatccggga ccccgcggtg 840
 aagtacgccc agctgggccc ggccttcgtc cgctgggccc acgggcacgt ggtggatccc 900
 gcggcctggc gcgagttcgt cgacgccgtg ccgccgtact ggcgcaaata ggtggccgag 960
 ctggcccgtt cgtgcgccag cgcctgggtg gcgttcgccc aggaactgga ggaccgggag 1020
 tga 1023

<210> 71
 <211> 493

<212> PRT

<213> Micromonospora sp. strain 046-EC011

<400> 71

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20 25 30
Ala Ala Ala Pro Gln Ala Pro Thr Phe Asp Leu Asp Asn Gly Asn Ala
35 40 45
Leu Thr Asp Val Ile Tyr Pro Ala Leu Asn Thr Glu Pro Arg Val Glu
50 55 60
Tyr Ser Gly Arg Pro Gly Ser Trp Ala Ala Asp Arg Ala Met Leu Ile
65 70 75 80
Glu Leu Pro Trp Phe Asp Ala Leu Ala Ala Tyr His Pro Thr Ala Val
85 90 95
Gly Ile Phe Ser Thr Ile Gly Arg Arg Pro Ala Glu Glu His Thr Thr
100 105 110
Arg Asn Lys Asn Ile Ala Val Ile Tyr Ser Ala Tyr Thr Ser Leu Ser
115 120 125
Lys Leu Tyr Pro Gln His Glu Ala Thr Trp Gln Arg Met Met Ala Thr
130 135 140
Ala Gly Leu Asp Pro Ala Val Thr Ala Glu Asp Arg Thr Thr Ala Ser
145 150 155 160
Gly Ile Gly Ile Leu Ala Ser Lys Asn Ala Met Ala Ala Arg Arg Asn
165 170 175
Asp Gly Thr Asn Arg Asp Gly Asp Ala Gly Gly Arg Arg Tyr Asn Arg
180 185 190
Glu Pro Tyr Ala Asp His Thr Gly Tyr Arg Pro Val Asn Ser Pro Tyr
195 200 205
Glu Leu Arg Phe Pro Ser Arg Trp Gln Pro Asn Thr Ile Ser Lys Arg
210 215 220
Glu Val Val Leu Thr Gln Glu Phe Ala Thr Pro Gln Phe Gly Arg Val
225 230 235 240
Lys Pro Ile Thr Phe Glu Arg Pro Glu Gln Phe Arg Leu Thr Pro Pro
245 250 255
Pro Asn His His Leu Leu Asn Pro Lys Gly Tyr Arg Lys Gln Ala Asp
260 265 270
Glu Val Leu Arg Ala Ser Ala Gly Leu Asp Asp Arg Lys Lys Met Ser

275	280	285
Ala Glu Ile Phe Ser Asp Asn Ile Thr Pro Tyr Gly Ala Ile Ala His 290 295 300		
Thr Leu Leu Arg Gly Arg Tyr Asn Thr Glu Asp Ser Val Arg Phe Ile 305 310 315 320		
Val Met Thr Asp Val Ala Gly Phe Asp Val Ala Ile Ala Ser Trp Tyr 325 330 335		
Tyr Met Arg Lys Tyr Asp Ser Val Gln Pro Phe Ser Ala Ile Arg His 340 345 350		
Leu Tyr Pro Asn Lys Lys Leu Thr Ala Trp Gly Gly Pro Gly Arg Gly 355 360 365		
Thr Val Asn Asp Ile Thr Gly Thr Gln Trp Arg Ser Tyr Leu Ser Ser 370 375 380		
Val Ala Ile Ala Ala Pro Asp Tyr Pro Ser Val Asn Ala Ala Val Cys 385 390 395 400		
Val Ala Tyr Ala Gln Val Ala Arg Arg Phe Thr Gly Thr Asp Lys Leu 405 410 415		
Thr Val Val Ile Pro Val Arg Lys Gly Ser Ser Ile Val Glu Pro Gly 420 425 430		
Val Thr Pro Ala Ala Asp Met Met Leu Thr Trp Asn Ser Tyr Ser Glu 435 440 445		
Trp Ala Ala Glu Cys Gly Gln Ser Arg Val Trp Ala Gly Glu Asn Phe 450 455 460		
Pro Ala Ser Val Ala Ala Ala Asp Gln Tyr Ala Pro Gln Ile Gly Asp 465 470 475 480		
Arg Ala Phe Asp Phe Val Gln Ser Lys Leu Asn Gly Arg 485 490		

<210> 72

<211> 1482

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 72

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ttcgacctcg acaacgggaa cgccctgacc gacgtcatct acccggccct caacaccgag 180

ccgcgggtcg agtacagcgg ccggcccggg tcctggggccg cggaccgcgc catgctcatc 240

gaactgccgt ggttcgacgc cctggcggcg taccaccca ccgcggtcgg catcttctcc 300

accatcggcc gccgtcccgc cgaggagcac acgacgcgca acaagaacat cgccgtcatc	360
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atgatggcca ccgcggggcct ggacccggcc gtcaccgcgg aggaccggac caccgccagc	480
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<210> 73

<211> 9762

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 73

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<210> 74
<211> 112
<212> PRT
<213> Micromonospora sp. strain 046-EC011

<400> 74

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Leu	Glu	Tyr	Cys	Val	Leu	Ala	Leu	Leu	Ser	Arg	Arg	Asp	Met	Tyr	Gly
			20					25					30		
Leu	Glu	Leu	Ala	Asp	Trp	Leu	Ala	Val	Arg	Gly	Leu	Thr	Ala	Ser	Glu
			35					40				45			
Gly	Ser	Leu	Tyr	Pro	Leu	Leu	Ala	Arg	Met	Arg	Gln	Ala	Gly	Ser	Val
	50					55					60				
Gln	Thr	Arg	Trp	Val	Ala	Pro	Glu	Gln	Gly	His	Ala	Arg	Arg	Tyr	Tyr
65					70				75					80	
Ala	Ile	Thr	Asp	Gln	Gly	Arg	Ala	His	Leu	Arg	Val	Phe	Ala	Ala	Val
				85					90					95	

Trp Gln Glu Ile Gln Pro His Val Asp Asp Leu Met Gly Glu Glu Ala
100 105 110

<210> 75
<211> 339
<212> DNA
<213> Micromonospora sp. strain 046-EC011

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gccggctccg tgcagacccg gtgggtggcc cccgagcagg ggcacgcccg gcggtactac 240
gcgatcaccg accaggggcg ggcgcacctg cgggtgttcg cggcgggtgtg gcaggagatc 300
cagccgcacg tggacgacct gatgggggag gaagcatga 339

<210> 76
<211> 325
<212> PRT
<213> Micromonospora sp. strain 046-EC011

<400> 76

Met Ser Asp Asp Gly Leu Pro Glu Ala Ala Trp Thr Tyr Leu Arg Ala
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Leu Asp Ala Glu Leu Ser Asp Val Pro Ser Gly Thr Ala Glu Glu Ile
20 25 30
Val Ala Asp Val Arg Ala His Ile Ala Asp Ala Leu Asp Ser Gly Arg
35 40 45
Ser Ala His Glu Ile Leu Ala Gly Leu Gly Ala Ala Arg Asp Val Ala
50 55 60
Arg Gln Ala Arg Glu Glu Leu Gly Leu Pro Ala Gln Asp Arg Pro Ala
65 70 75 80
Arg Ala Gly Arg Thr Leu Ser Leu Ala Ala Val Ala Val Gly Val Leu
85 90 95
Ile Ala Val Cys Val Ser Phe Leu Leu Pro Ser Ala Val Pro Val Glu
100 105 110
Pro Ile Gln Ala Gly Pro Gly Glu Gln Gly Val Leu Arg Arg Leu Gly
115 120 125
Pro Gly Ile Ala Leu Leu Thr Leu Leu Pro Ala Leu Val Ala Ala Ala
130 135 140
Pro Leu Val Ala Pro Ala Arg Ala Arg Ala Gly Val Arg Phe Ala Gly

145		150		155		160
Ala Ala Val	Leu Thr Met Phe Ala Cys	Ala Ala Gly Glu Thr Gly	Leu			
	165	170	175			
Tyr Tyr Phe	Pro Leu Ala Leu Met	Ala Trp Ala Ala Ala	Ile Val Pro			
	180	185	190			
Trp Ala Leu	Arg Arg Gly Ala Gly Gly	Arg Trp Trp Arg	Tyr Leu Thr			
	195	200	205			
Gly Gly Phe	Val Ala Met Pro Gly Val	Leu Val Ala Val	Ala Ser Ala			
	210	215	220			
Gly Gly Ser	Val Gly Val Gly Trp Val	Gly Ala Ala Leu	Trp Ile Ala			
	225	230	235	240		
Gly Pro Leu	Ala Ala Gly Ala Leu Cys	Ala Tyr Gly Ile Arg	Ala Gly			
	245	250	255			
Tyr Ala Val	Thr Ala Leu Ala Gly Ala	Leu Ala Ile Ala	Leu Ser Met			
	260	265	270			
Ala Glu Arg	Gly Phe Leu Phe Ala Ala	Phe Trp Leu Phe	Gly Gly Leu			
	275	280	285			
Tyr Leu Ala	Leu Gly Ala Ala Ala Tyr	Thr Ala Ser Arg	Ala Val Asp			
	290	295	300			
Gly Asp Ala	Ala Ala Thr Pro Gly Pro	Pro Ala Arg Pro	Glu Pro Ala			
	305	310	315	320		
Pro Ala Pro	Gly Gly					
	325					

<210> 77

<211> 978

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 77

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gccgacgccc tcgacagcgg acggagcgcc caccagatcc tcgccggcct cggcgccgcg	180
cgggacgtgg cccggcaggc gcgcgaggag ctggggctgc cggcccagga ccgcccggcc	240
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<210> 78
<211> 663
<212> PRT
<213> Micromonospora sp. strain 046-ECO11

<400> 78

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Ala Leu Asp Gly Arg Trp Ala Glu Val Arg Arg Ala His Arg Glu His
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Leu Asp Glu Arg Phe Leu Pro Val Tyr Gly Glu Thr Gly Asp Gln Ala
35 40 45
Arg Glu Arg Ile Thr Arg Leu Leu Ser Glu Leu Pro Val Glu Leu Gly
50 55 60
Ile Ala Ser Gly Phe Pro Ala Glu Tyr Gly Gly Arg Gly Asp Val Gly
65 70 75 80
Ala Ser Ile Val Ala Thr Glu Met Leu Ala Gln Val Asp Leu Ser Leu
85 90 95
Met Val Lys Ala Gly Val Gln Trp Gly Leu Phe Gly Gly Ala Val Ala
100 105 110
Ala Leu Gly Thr Lys Arg His His Asp Ala Tyr Leu Arg Asp Ile Val
115 120 125
Ala Gly Arg Leu Phe Gly Cys Phe Ala Met Thr Glu Thr Gly His Gly
130 135 140
Ser Asp Val Gln Gln Leu Arg Thr Thr Cys Val Tyr Asp Pro Gln Thr
145 150 155 160
Gln Thr Phe Asp Leu His Thr Pro His Glu Ala Ala Arg Lys Asp Tyr

165					170					175					
Ile	Gly	Asn	Ala	Ala	Arg	Asp	Gly	Arg	Met	Ala	Val	Val	Phe	Ala	Gln
			180					185					190		
Leu	Val	Thr	Gly	Gly	Arg	Arg	His	Gly	Val	His	Ala	Trp	Leu	Val	Pro
		195					200					205			
Ile	Arg	Asp	Glu	His	Gly	Lys	Pro	Met	Pro	Gly	Val	Thr	Ile	Gly	Asp
	210					215					220				
Ala	Gly	Pro	Lys	Ala	Gly	Leu	Leu	Gly	Val	Asp	Asn	Gly	Arg	Leu	Ser
225					230					235					240
Phe	Asp	His	Val	Arg	Val	Pro	Arg	Glu	Met	Leu	Leu	Asp	Gln	Tyr	Ala
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Gln	Val	Ala	Glu	Asp	Gly	Thr	Tyr	Ser	Ser	Pro	Ile	Glu	Asn	Asp	Ser
			260					265					270		
Arg	Arg	Phe	Phe	Thr	Met	Leu	Gly	Thr	Leu	Val	Arg	Gly	Arg	Val	Ser
		275					280					285			
Val	Gly	Gly	Ala	Ala	Ser	Ala	Ala	Thr	Lys	Ser	Ala	Leu	Ala	Ile	Ala
	290					295					300				
Val	Arg	Tyr	Gly	Asp	Ile	Arg	Arg	Gln	Phe	Ala	Asp	Ala	Asp	Gly	Asp
305					310					315					320
Arg	Glu	Val	Leu	Leu	Asn	Asp	Tyr	Leu	Ala	His	Gln	Arg	Lys	Leu	Leu
			325						330					335	
Pro	Ala	Leu	Ala	Thr	Thr	Tyr	Ala	Leu	Thr	Phe	Ala	Gln	Ala	Glu	Leu
			340					345					350		
Val	Ala	Ala	Leu	Asp	Asp	Ile	Gln	Gly	Gly	Asp	Gly	Pro	Val	Asp	Glu
		355					360					365			
His	Arg	Gln	Arg	Glu	Leu	Glu	Ser	Arg	Ala	Ala	Gly	Leu	Lys	Ala	Ala
	370					375					380				
Gln	Thr	Trp	His	Ala	Thr	Arg	Thr	Ile	Gln	Ile	Cys	Arg	Glu	Ala	Cys
385					390					395					400
Gly	Gly	Ala	Gly	Tyr	Leu	Ser	Glu	Asn	Arg	Leu	Pro	Ser	Leu	Lys	Ala
				405					410					415	
Asp	Thr	Asp	Val	Phe	Thr	Thr	Phe	Glu	Gly	Asp	Asn	Thr	Val	Leu	Leu
			420					425					430		
Gln	Leu	Val	Ala	Lys	Gly	Leu	Leu	Thr	Gly	Tyr	Arg	Asp	Glu	Phe	Gly
		435					440					445			
Ser	Leu	Asp	Gly	Trp	Gly	Arg	Ala	Ser	Phe	Val	Ala	Glu	Gln	Val	Arg
	450					455					460				
Glu	Met	Val	Leu	Glu	Arg	Thr	Ala	Ala	Arg	Ala	Leu	Ile	Ala	Arg	Leu

465		470		475		480
Val Ser Ala Val	Pro Gly Arg Asp Asp	Glu Val Ala Val	Thr Asp Arg			
	485		490		495	
Gly Trp Gln Leu	Lys Leu Phe Glu Asp Arg	Glu Glu His Leu	Leu Asp			
	500		505		510	
Ser Ala Val Arg	Arg Leu Arg Gly Gly Ala Ser	Thr Lys Lys Asp	Arg			
	515		520		525	
Pro Phe Asp Ile	Phe Asn Asp Val Gln Asp His	Val Leu Ala Val	Ala			
	530		535		540	
Ala Ala His Ile	Asp Arg Val Thr Leu Glu Ala	Phe Val Ala Gly	Ile			
	545		550		555	
Asp Ala Ile Ala	Asp Pro Ala Val Lys Glu Leu Leu	Ser Arg Val Cys				
	565		570		575	
Asp Leu Tyr Ala	Leu Thr Val Ile Glu Ala Asn Lys	Gly Trp Leu Leu				
	580		585		590	
Glu His Gly Arg	Leu Thr Pro Ala Arg Ser Lys Thr	Ile Thr Ser Val				
	595		600		605	
Val Asn Gly Leu	Leu Lys Glu Leu Arg Pro Asp Met	Arg Thr Leu Val				
	610		615		620	
Asp Gly Phe Ala	Ile Pro Asp Ala Trp Leu His Ala	Ala Ile Leu Arg				
	625		630		635	
Glu Glu Pro Val	Arg Gln Glu Thr Met Ala Ala His	Asp Ala Ala Gly				
	645		650		655	
Asp Pro Gln Ala	Val Pro Ala					
	660					

<210> 79
 <211> 1992
 <212> DNA
 <213> Micromonospora sp. strain 046-EC011

<400> 79	
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accggctacc gggacgagtt cggctcgctc gacggctggg gacgcgcctc cttcgtggcc	1380
gagcaggtac gcgagatggt gctggaacgc accgccgcgc gggcgctgat cgcacgtctg	1440
gtcagcgccg tgcccgggcg cgacgacgag gtcgccgtca ccgaccgggg ctggcagctc	1500
aagctcttcg aggaccgca ggagcacctg ctcgacagcg cggtcgccg cctgcgcggt	1560
ggcgcgtcca ccaagaagga ccgccccttc gacatcttca acgacgtcca ggaccacgtc	1620
ctcgccgtcg ccgcggcgca catcgaccgg gtgacgctgg aggcgttcgt cgccgggac	1680
gacgccatcg ccgaccggc ggtcaaggaa ctgctgtccc gggctctgca cctgtacgcg	1740
ctcaccgtga tcgaggcgaa caagggtgg ctgctcgagc acggccggct caccgcggcc	1800
cgctcgaaga ccatcaccag cgtggtgaac gggctgctca aggagctgcg cccggacatg	1860
cgcacgctcg tggacggctt cgccatcccg gacgcgtggc tgcacgggc gatcctgcgc	1920
gaggagcccg tccggcagga gacgatggcc gcgcacgacg ccgccggcga cccgcaggcc	1980
gtccccgct ag	1992

<210> 80

<211> 573
 <212> PRT
 <213> Micromonospora sp. strain 046-EC011

<400> 80

Val	Ser	Pro	Leu	Pro	Pro	Gly	Ser	Ala	Val	Thr	Ala	Arg	His	Val	Leu	1	5	10	15
Arg	Gln	Ala	Leu	Arg	Arg	Gln	Arg	Arg	Pro	Val	Leu	Ile	Gly	Val	Thr	20	25	30	
Leu	Leu	Gly	Leu	His	Gln	Val	Thr	Glu	Ala	Leu	Val	Pro	Val	Ala	Ile	35	40	45	
Gly	Val	Ile	Ile	Asp	Arg	Ala	Val	Val	Thr	Gly	Asp	Pro	Trp	Ala	Leu	50	55	60	
Ala	Tyr	Ser	Val	Ala	Gly	Leu	Ala	Ala	Leu	Phe	Thr	Val	Leu	Ala	Phe	65	70	75	80
Ala	Tyr	Arg	Asn	Gly	Ala	Arg	Gln	Ala	Phe	Ala	Ala	Val	Glu	Arg	Glu	85	90	95	
Ala	His	Leu	Leu	Arg	Val	Glu	Leu	Ala	Glu	Arg	Ala	Leu	Asp	Pro	Arg	100	105	110	
Gly	His	Arg	Ser	Gly	Leu	Arg	Asp	Gly	Glu	Leu	Leu	Ser	Val	Ala	Ala	115	120	125	
Ser	Asp	Ala	Glu	Leu	Ser	Ala	Tyr	Val	Val	Arg	Val	Ala	Gly	Phe	Gly	130	135	140	
Val	Ala	Ala	Val	Ser	Ala	Leu	Thr	Val	Ala	Ala	Val	Ala	Leu	Leu	Val	145	150	155	160
Ile	Asp	Val	Pro	Leu	Gly	Leu	Gly	Val	Leu	Ile	Gly	Val	Pro	Val	Leu	165	170	175	
Val	Leu	Ala	Leu	Gln	Arg	Met	Ala	Pro	Leu	Leu	Ser	Arg	Arg	Ser	Ala	180	185	190	
Ser	Gln	Gln	Glu	Ala	Leu	Ala	Glu	Thr	Thr	Ala	Leu	Ala	Val	Asp	Leu	195	200	205	
Val	Ser	Gly	Leu	Arg	Val	Leu	Arg	Gly	Ile	Gly	Ala	Gln	His	His	Ala	210	215	220	
Ala	Gly	Arg	Tyr	Ala	Glu	Ala	Ser	Arg	Arg	Ala	Leu	Ala	Val	Thr	Leu	225	230	235	240
Arg	Ala	Ala	Asn	Thr	Lys	Gly	Leu	His	Leu	Gly	Leu	Thr	Thr	Ala	Ala	245	250	255	
Asn	Gly	Leu	Phe	Leu	Ala	Ala	Val	Ala	Gly	Val	Ala	Gly	Trp	Leu	Ala	260	265	270	

Leu Arg Gly Arg Leu Thr Ile Gly Glu Leu Val Thr Val Val Gly Leu
 275 280 285
 Ala Gln Phe Val Ala Glu Pro Val Gln Thr Leu Gly Tyr Cys Val Gln
 290 295 300
 Leu Phe Ala Met Ala Arg Ala Ser Ala Ala Arg Val Gly Arg Val Leu
 305 310 315 320
 Gly Ala Glu Pro Leu Thr Arg Pro Gly Ser Ala Pro Arg Pro Asp Arg
 325 330 335
 Thr Asp Gly Pro Arg Leu Val Leu Asp His Val Gly His Ala Ala Leu
 340 345 350
 Asp Gly Val Cys Leu Arg Val Asp Pro Gly Glu Ile Val Gly Val Leu
 355 360 365
 Ala Tyr Asp Pro Ala Asp Ala Asp Ala Leu Val Ala Leu Leu Ser Gly
 370 375 380
 Arg Val Pro Ala Asp Arg Arg Arg Gly Thr Val Arg Val Asp Gly Val
 385 390 395 400
 Pro Ala Asp Asp Leu Asp Val Asp Ala Leu Arg Gly Ala Val Leu Val
 405 410 415
 Glu Pro His Asp Val Thr Leu Phe Glu Gly Thr Val Ala Ala Asn Leu
 420 425 430
 Ala Ala Gly Ser Arg Thr Glu Glu Gly Arg Leu Arg Ala Ala Val Arg
 435 440 445
 Ala Ala Ala Ala Asp Asp Val Val Asp Ala His Pro Gly Gly Leu Gly
 450 455 460
 His Arg Leu Val Glu Arg Gly Ala Asn Leu Ser Gly Gly Gln Arg Gln
 465 470 475 480
 Arg Leu Gly Leu Ala Arg Ala Leu His Ala Asp Pro Pro Val Leu Val
 485 490 495
 Leu His Asp Pro Thr Thr Ala Val Asp Ala Ala Thr Glu Ala Gln Leu
 500 505 510
 Ala Asp Gly Leu Ala Gly Ala Arg Arg Glu Ala Pro Arg Gly Thr Leu
 515 520 525
 Leu Val Thr Ser Ser Pro Ala Leu Leu Arg Ile Thr Asp Arg Val Val
 530 535 540
 Val Ile Ala Asp Gly Arg Val Thr Ala Glu Gly Thr His Glu His Leu
 545 550 555 560
 Leu Ala Thr Asp Ala Arg Tyr Arg Glu Glu Thr Leu Arg
 565 570

<210> 81
 <211> 1722
 <212> DNA
 <213> Micromonospora sp. strain 046-EC011

<400> 81
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 gaggcgctcg tgccggtggc gatcggcgtc atcatcgacc gggccgtggt gaccggcgac 180
 ccgtggggcg tcgcgtactc cgtcgccggc ctcgccgccc tggttcaccgt gctggcgctc 240
 gcctaccgca acggcgcccc ccaggcgctc gcggcggtgg aacgggaggc gcacctgctg 300
 cgggtcgagc tggccgagcg cgcgctcgac ccgcgcgggc accgctccgg cctgcgcgac 360
 ggcgagctgc tctcggtcgc cgcctccgac gccgaactct ccgcgtacgt ggtccgggtg 420
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 atcgacgtcc cgctcggact cggcgtgctc atcggcgta cgggtgctggt cctggcgctg 540
 caacggatgg cgccgctgct gtcccggcgc agcgccctcc agcaggaggc cctcgcgagg 600
 accacggcgc tcgccgtgga cctcgtctcc ggctgcgcgc tgctgcgcgg catcggcgcc 660
 cagcaccacg ccgccggccg gtacgccgag gccagccgac gcgccctcgc cgtgacgctg 720
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 ctgcgcccg tcgccggggg cgccgggtgg ctgcgcgtgc gcggccggct caccatcggc 840
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 tactgcgtgc agctgttcgc gatggcccg gcctccgccc cccgggtcgg gcgcgtgctc 960
 ggcgccgagc cgctgacctg gccgggcagc gcgccccggc cggaccgcac ggacggggccg 1020
 cggctcgttc tcgaccacgt cggccacgcc gcgctggacg ggggtgtgcct gcgcgtcgac 1080
 ccgggagaga tcgtcggcgt cctggcgtag gaccggcccg acgcggacgc gctgggtggc 1140
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 ggcgcctgc gcgcccggt ccgggcggcc gcggcgagc acgtggtgga cgcgcacccc 1380
 ggcggcctcg gccaccggct cgtcgagcgg ggcgccaacc tctccggcgg gcagcgccag 1440
 cggctcgggc tggcgcgggc gctgcacgcc gaccgcggcg tgctggtgct gcacgacccc 1500
 accaccgccg tggacgcggc caccgaggcc caactcgccg acggactggc cggcgcgcg 1560

cgcggaagcgc cccgggggcac gctgctgggtc accagcagcc ccgccctgct gcggatcacc 1620
gaccgggtgg tggatgatcgc cgacggccgg gtgaccgccc aggggacgca cgagcacctg 1680
ctggccaccg acgcccgccta ccgcgaggag aactgcggt ga 1722

<210> 82
<211> 596
<212> PRT
<213> Micromonospora sp. strain 046-EC011

<400> 82

Val	Thr	Ala	Asp	Pro	Arg	Thr	Ala	Glu	Pro	Thr	Arg	Val	Leu	Leu	Pro	
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Thr	Ala	Thr	Ala	Arg	Arg	Thr	Trp	Thr	Thr	Leu	Gly	Ala	Glu	Phe	Arg	
			20					25					30			
Arg	Arg	Pro	Gly	Leu	Ser	Ala	Ala	Ala	Thr	Ala	Val	Leu	Val	Ala	Ala	
		35					40					45				
Ala	Thr	Gly	Gly	Leu	Val	Ala	Pro	Trp	Val	Leu	Gly	Arg	Leu	Val	Asp	
	50					55					60					
Asp	Val	Ile	Ala	Asp	Ala	Pro	Val	Ser	Arg	Ile	Ala	Gly	Arg	Val	Ala	
65					70				75						80	
Val	Ile	Ala	Gly	Ala	Ala	Val	Leu	Thr	Gly	Leu	Leu	Thr	Ala	Ala	Gly	
			85						90					95		
Ala	Ala	Leu	Ala	Ser	Arg	Leu	Gly	Glu	Thr	Val	Leu	Ala	Arg	Leu	Arg	
		100						105					110			
Glu	Arg	Val	Leu	Asp	Arg	Ala	Leu	His	Leu	Pro	Ser	Ala	Thr	Leu	Glu	
		115					120					125				
Arg	Ala	Gly	Thr	Gly	Asp	Leu	Leu	Ala	Arg	Val	Gly	Asp	Asp	Val	Ala	
	130					135					140					
Val	Val	Thr	Asn	Val	Ile	Ala	Val	Ser	Gly	Pro	Ala	Phe	Val	Gly	Ala	
145					150					155					160	
Leu	Leu	Ser	Val	Val	Leu	Thr	Val	Phe	Gly	Leu	Val	Ala	Leu	Asp	Trp	
			165						170					175		
Arg	Leu	Gly	Leu	Ala	Gly	Leu	Val	Ala	Ala	Pro	Ala	Tyr	Ala	Leu	Ala	
			180					185					190			
Leu	Arg	Trp	Tyr	Leu	Arg	Arg	Ser	Ala	Pro	Tyr	Tyr	Ala	Arg	Glu	Arg	
		195					200					205				
Val	Ala	Thr	Gly	Glu	Arg	Thr	Gln	Ala	Met	Ala	Gly	Ala	Leu	Arg	Gly	
	210					215					220					

Ala Ala Thr Val Arg Ala Tyr Arg Thr Glu Asp Ala His Val Ala Ala
 225 230 235 240
 Ile Ala Glu Arg Ser Gly Val Ala Arg Asp Leu Ser Leu Glu Ile Phe
 245 250 255
 Asn Leu His Thr Arg Phe Gly Leu Arg Ile Asn Arg Ser Glu Phe Leu
 260 265 270
 Gly Leu Ala Ala Val Leu Val Ala Gly Phe Phe Leu Val Arg Ala Asp
 275 280 285
 Leu Val Thr Val Gly Ala Ala Thr Thr Ala Ala Leu Tyr Phe His Arg
 290 295 300
 Leu Phe Asn Pro Ile Gly Leu Leu Leu Met Glu Ser Asp Ser Val Leu
 305 310 315 320
 Gln Ala Gly Ala Ser Leu Ala Arg Leu Val Gly Val Ala Thr Leu Pro
 325 330 335
 Asp Thr Ala Pro Ser Gly Pro Ala Pro Ser Ala Ala Gly Arg Arg Gly
 340 345 350
 Pro Ala Ala Leu Asp Val Thr Val Arg Arg His Arg Tyr Asp Asp Asp
 355 360 365
 Gly Pro Leu Val Leu Ala Asp Val Asp Leu Arg Leu Ala Pro Gly Glu
 370 375 380
 Arg Val Ala Leu Val Gly Ala Ser Gly Ala Gly Lys Ser Thr Leu Ala
 385 390 395 400
 Gly Ile Ala Ala Gly Ile Ile Ala Pro Thr Asp Gly Ser Val Arg Leu
 405 410 415
 Gly Gly Val Pro Leu Thr Glu Arg Gly Glu His Ala Val Arg Arg Asp
 420 425 430
 Val Ala Leu Val Ser Gln Glu Val His Val Phe Ala Gly Pro Leu Ala
 435 440 445
 Glu Asp Leu Arg Leu Ala Ala Pro Asp Ala Thr Asp Ala Glu Leu Leu
 450 455 460
 Asp Ala Leu Asp Arg Val Gly Ala Thr Thr Trp Leu Arg Ala Leu Pro
 465 470 475 480
 Asp Gly Leu Ala Thr Ala Val Gly Glu Gly Gly His Arg Leu Thr Ala
 485 490 495
 Ala Gln Ala Gln Gln Val Ala Leu Ala Arg Leu Val Leu Ala Ala Pro
 500 505 510
 Ala Val Ala Val Leu Asp Glu Ala Thr Ala Glu Ala Gly Ser Ala Gly
 515 520 525

Ala Arg Asp Leu Asp Arg Ala Ala Leu Ala Ala Thr Glu Gly Arg Thr
530 535 540

Thr Leu Ile Val Ala His Arg Leu Ser Gln Ala Val Ala Ala Asp Arg
545 550 555 560

Ile Val Leu Leu Asp His Gly Arg Ile Val Glu Gln Gly Thr His Ser
565 570 575

Glu Leu Leu Ala Ala Asp Gly Arg Tyr Gly His Leu Trp Arg Ser Trp
580 585 590

Ser Val Pro Val
595

<210> 83
<211> 1791
<212> DNA
<213> Micromonospora sp. strain 046-EC011

<400> 83
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gcgaccgccg tgctcgtcgc cgccgccacc ggccgggctgg tcgcgccctg ggtgctcggc 180
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gccgggctgg tcgccgcgc cgctacgcg ctggcgctgc gctggtagct gcgccggctg 600
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atcgccgagc gctccggcgt ggcgcgcgac ctgtcgctgg agatcttcaa cctgcacacc 780
cggttcgggc tcgggatcaa caggtcggag ttctcggcc tggccgcggt gtcgctcgcc 840
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cgccggcacc gctacgacga cgacggccct ctggtcctgg ccgacgtcga cctgcgcctg 1140
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 gccgacggcc ggtacgggca tctgtggcgc tcctggagcg tcccggtatg a 1791

<210> 84
 <211> 507
 <212> PRT
 <213> Micromonospora sp. strain 046-EC011

<400> 84

Met	Thr	Asp	Ala	Pro	Ala	Arg	Phe	Val	Leu	Phe	Pro	Gly	Arg	His	His
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Leu	Leu	Thr	Arg	Phe	Gln	Ala	Asp	Tyr	Leu	Arg	Arg	Leu	Ala	Gly	Asp
			20					25					30		
Asp	Ala	Thr	Val	Val	Trp	Ala	Val	Thr	Ser	Ala	Asn	His	Glu	Asn	Thr
			35				40					45			
Arg	Arg	Asn	Pro	Val	Pro	Tyr	His	Arg	Arg	Glu	Ala	Ala	Ile	Glu	Arg
		50				55				60					
Phe	Ser	Val	Leu	Ser	Gly	Leu	Arg	Ser	Val	Val	Val	Pro	Ile	Phe	Asp
65					70				75					80	
Thr	Ala	Tyr	Thr	Asp	Ala	Phe	Ala	Glu	Val	Thr	Leu	Lys	Ser	Ile	Ala
				85				90						95	
Val	Ala	Thr	Gly	Leu	Glu	Leu	Thr	Pro	Ala	Asp	Thr	Val	Leu	Ala	Cys
			100					105					110		
Ser	Thr	Pro	Glu	Val	Ala	Lys	Leu	Tyr	Glu	Gln	Leu	Gly	Phe	Ser	Ile
			115				120					125			
Ala	Pro	Val	Glu	Ala	Asp	Pro	Asp	Leu	Pro	Glu	Pro	Pro	Glu	Arg	Pro

130	135	140															
Trp	Asp	Val	Leu	Leu	Arg	Leu	Ala	Ala	Gly	Asp	Glu	Thr	Trp	Arg	Ala		
145					150					155					160		
Leu	Thr	His	Pro	Ala	Thr	Ile	Asp	Val	Phe	Glu	Arg	Tyr	Arg	Leu	Val		
				165					170					175			
Glu	Ser	Ile	Arg	Ser	Val	Val	Asn	Asp	Pro	Leu	Val	Gly	Asp	Glu	Gly		
			180					185					190				
Gly	Leu	Thr	Val	Thr	Arg	Asp	Tyr	Arg	Thr	Tyr	Val	Glu	Ala	Phe	Ala		
		195					200					205					
Thr	Ala	Ala	Gln	Arg	Lys	Trp	Asp	Ser	Val	Arg	Arg	Tyr	Val	Gln	Pro		
	210					215					220						
Gly	Arg	Ile	Val	Asp	Ile	Gly	Cys	Gly	Ala	Gly	Ala	Val	Leu	Glu	Leu		
225					230					235					240		
Ala	Asp	Arg	Glu	Ala	Ala	Leu	Arg	Glu	Ser	Asp	Leu	Ile	Gly	Val	Glu		
				245					250					255			
Val	Ala	Arg	His	Leu	Tyr	Gln	Glu	Cys	Leu	His	Lys	Lys	Ala	Gln	Gly		
			260					265					270				
Val	Phe	Arg	Asn	Ala	Asn	Val	Tyr	Phe	Phe	His	Arg	Asn	Val	Leu	Gly		
		275					280					285					
Gly	Ala	Val	Phe	Lys	Asp	Arg	Ser	Val	Asp	Thr	Thr	Leu	Thr	Phe	Ala		
	290					295					300						
Leu	Thr	His	Glu	Ile	Trp	Ser	Tyr	Gly	Arg	Arg	Arg	Glu	Ser	Leu	Leu		
305					310					315					320		
Gln	Phe	Ala	Arg	Arg	Ile	His	Asp	His	Thr	Val	Pro	Gly	Gly	Val	Trp		
				325					330					335			
Ile	Asn	Ser	Asp	Val	Cys	Gly	Pro	Asp	Asp	Pro	Arg	Arg	Gln	Val	Leu		
			340					345					350				
Leu	Arg	Leu	Ser	Thr	Asp	Asp	Gly	Asp	Asn	Pro	Ala	Ala	Pro	Arg	Pro		
		355					360					365					
Asp	Leu	Ala	Glu	Leu	Thr	Ser	Ala	Glu	Val	Arg	Arg	Tyr	Val	Gly	Gly		
	370					375					380						
Leu	Ser	Thr	Arg	Ala	Arg	Leu	Asp	Gln	Phe	Ala	Val	Asp	Phe	Ala	Phe		
385					390					395					400		
Asp	Phe	Asp	Tyr	Glu	Pro	Leu	Pro	Asp	Gly	Ala	Val	Arg	Leu	Thr	Leu		
				405					410					415			
Gly	Ala	Ala	Met	Asp	Tyr	Leu	Thr	Arg	Lys	Asp	Tyr	Thr	Asp	Asn	Trp		
			420					425					430				
Leu	Ser	Glu	Thr	Gln	Glu	Gln	Phe	Cys	Gly	Leu	Ser	Phe	Ala	Asp	Trp		

435		440		445
Thr Asp Leu Leu Thr Glu Ala Gly Phe Glu Ile Gly Pro Ala Ser Ala				
450		455		460
Pro Val Arg Asn Glu Trp Val Ile Asp Asn Arg Ile Ala Pro Val Ala				
465		470		475
				480
Ser Leu Thr Asp Leu Asp Gly Arg Pro Leu Asp Trp Pro Thr Thr His				
	485		490	495
Val Leu Thr Val Ala His Arg Pro Arg Asn Gln				
	500		505	

<210> 85

<211> 1524

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 85

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acgtcggcca accacgagaa caccaggcgc aacccgggtgc cctaccaccg gcgggaggcc	180
gcgatcgaac gattcagcgt gctgagcggg ctgcgctcgg tgggtggtgcc gatcttcgac	240
accgctaca ccgacgcgtt cgccgagggt acgctgaagt ccatcgcggt ggccaccggg	300
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ctcaccacc cgccaccat cgacgtgttc gagcgctacc gcctggtcga gtcgatccgg	540
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gccgaccggg aggccgcgct gcgtgagagc gacctgatcg gcgtggagggt cgcccgccac	780
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cagttcgccc gccgcatcca cgaccacacg gtgcccggcg gcgtctggat caacagcgac	1020
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gacaaccggy ccgcgccccg ccccgacctc gccgagctga cctcggcgga ggtccggcgt	1140

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ccggcgtcgg cgccggtgcg caacgagtgg gtgatcgaca accggatcgc gccagtcgcg 1440
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gccacccgcc cccgcaacca gtga 1524

<210> 86
<211> 232
<212> PRT
<213> Micromonospora sp. strain 046-EC011

<400> 86

Val Ser Asp Ile Gln Ile Ile Ser Phe Val Ala Ala Ser Leu Leu Ile
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Ile Ile Val Pro Gly Val Asp Phe Ala Leu Val Thr Arg Gln Thr Val
20 25 30
Arg Tyr Gly Arg Arg Ala Gly Phe Val Val Leu Ala Gly Leu Phe Val
35 40 45
Ala Ala Leu Val His Ala Ser Phe Ala Thr Ala Gly Leu Ser Ala Leu
50 55 60
Leu Val Ser Ser Pro Thr Leu Tyr Thr Val Leu Arg Val Ala Gly Ala
65 70 75 80
Leu Tyr Leu Leu Tyr Leu Gly Gly Thr Ile Leu Trp Ala Thr Arg Pro
85 90 95
Arg Arg Thr Val Pro Ala Ala Gln Pro Val Thr Val Gly Ala Gly Gly
100 105 110
Ala Gly Pro Asp Thr Asp Thr Gly Pro Ala Pro Val Pro Asp Thr Pro
115 120 125
Ala Ala Asp Glu Pro His Val Ala Arg Arg Ser Phe Val Met Gly Val
130 135 140
Thr Ser Gln Leu Leu Asn Val Lys Val Val Val Phe Tyr Val Ser Phe
145 150 155 160
Val Pro Gln Phe Val Lys Pro Gly Glu Gly Ala Ala Ala Arg Thr Ala
165 170 175
Val Leu Ala Ala Thr Phe Ile Gly Leu Ala Val Leu Trp Trp Ala Cys

180 185 190

Tyr Ile Met Leu Ile Asp Arg Leu Gln Pro Trp Leu Thr Arg Pro Ser
195 200 205

Val Leu Leu Val Ile Glu Arg Leu Thr Gly Leu Ile Leu Ile Val Leu
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Ala Ile Arg Ile Ala Leu Ser Arg
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<212> PRT
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<400> 88

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Val Ser Val Asp His Asp Ala Gly Asp Gly Ala Glu Pro Leu Arg Gly
20 25 30

His Tyr His Gln Arg Gly Asp Leu Val Trp Ala Glu Ile Thr Gly Gly
35 40 45

Pro Val Arg His Gly Arg Leu Ala Gly Thr Cys Asp Ala Gln Gly Val
 50 55 60

Val Arg Phe Ala Tyr Leu Glu Val Leu Thr Asp Gly Thr Ile Val Ile
 65 70 75 80

Gly Glu Cys Glu Ser Arg Pro Glu Arg Leu Pro Asp Gly Arg Ile Arg
 85 90 95

Leu Arg Glu Gln Trp Arg Arg His Gly Pro Arg Gln Asp Ser Gly Val
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Ser Val Ile Glu Glu Ala Val Pro Ala Leu Ala Gly Gly Gln Glu Ser
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Arg Arg Arg Val
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<210> 89

<211> 399

<212> DNA

<213> Micromonospora sp. strain 046-EC011

<400> 89

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